UNH LIBRARY
3 4600 01598 0003

Eng
LD
3779
.N4
U5
1963/1964

University of
New Hampshire
Library

General Information

about the

University of New Hampshire

Volume LIV Number 3 November 1962

The Bulletin of the University of New Hampshire is published three times in January, twice in November and December, and once in September, March, and April. Second-class postage paid at Durham, N. H.

Introduction

OF all New England's colleges and universities, few are as ideally located as the University of New Hampshire. Durham is a small town at the tidehead of the Oyster River, centered midway between metropolitan Boston and the White Mountains of New Hampshire. To the south, one and one-half hours away, are the cultural opportunities which an urban area can offer: the theater, symphony, opera, museums. To the north, an equal distance in time, mountain climbing, skiing, and scenery. And twenty minutes to the east, the beaches and rocky coasts of New Hampshire and Maine. Thus, Durham, one of northern New England's earliest settlements, lies at the center of the nation's most historic region.

In a region long noted for higher education, the University of New Hampshire has brought a new dimension, that of public higher education. Founded first in 1866 at Dartmouth College in Hanover, the New Hampshire College of Agriculture and Mechanic Arts moved to Durham in 1892 to take up a separate existence as one of the nation's growing body of land-grant colleges. Thirty-one years later the institution became the state university and was renamed the University of New Hampshire, composed of the colleges of Agriculture, Liberal Arts, and Technology. In 1962 the Whittemore School of Business and Economics was established.

Throughout its history the University has sought to combine the philosophy of the land-grant movement with that of liberal education. The College's first professor was a chemist; its first president in the Durham location, a classicist; its most renowned faculty member, a pioneer in the study of rare earths, including uranium. Today students in the College of Agriculture take as much as two-thirds of their work in the arts and basic sciences, while students in technology combine study in the social sciences and humanities with professional training.

Undergraduates at the University are a cosmopolitan group. Approximately three-fourths of the students come from within the state and are, for the most part, from the top two-fifths of their high-school graduating classes. The remainder of the students, who usually must meet somewhat higher standards, come from a majority of the states and some 35 foreign nations.

The Programs of Study

THE University of New Hampshire offers three broad areas of study — agriculture, business and economics, liberal arts, and technology. The work of the University is so divided that when the student decides on the general field of study he wants to pursue, he is guided into a program which will meet his needs.

The student may devote his four years to a single college or he may cross college lines and take courses in several areas. This is possible because, as a university, the University of New Hampshire makes all its academic programs available to meet the requirements of every student.

Freshmen are assigned to one of the four colleges and schools within the University, but they need not make the final choice of their whole program until the sophomore year. Entering freshmen are given a series of tests which furnish information to enable the faculty to help them choose the curriculum for which they are best suited. Faculty advisers and the counseling staff also use these tests to help the students solve their educational and personal problems.

Certain courses are taken by all students. English is required in the freshman year. Women students are required to take physical education for four semesters. Men students, except those who have been in the military service, are required to take physical education for two semesters and military training during their first four semesters.

The University has maintained a healthy teacher-student ratio despite rising enrollments. In 1916, a faculty of 55 members served a student population of 666. This very favorable 1:11 ratio has increased only slightly in the intervening years. Today's resident faculty of 308 members provides one teacher for every 13 students.

Of the resident faculty, all except 47 members have reached professorial rank. Doctoral degrees have been earned by 55 percent of the faculty, and many have national and international reputations in their respective fields.

The College of Agriculture

The objectives of the College of Agriculture are to give students a fundamental education in the biological, physical, and social sciences and to provide specific technical training according to student interest in Agriculture, Agricultural Engineering, Forestry, or Home Economics.

Agriculture is broader than the production of food and fiber. It includes, in addition to production, the processing, distributing, and marketing of agricultural products and the servicing of production. A wide range of career opportunities is provided for adequately prepared college graduates. Governmental agencies, both advisory and regulatory, offer other career opportunities for graduates of agricultural colleges.

Many graduates of the College of Agriculture continue their education beyond the Bachelor's degree and obtain advanced degrees to qualify for specialized positions in teaching, research, extension, industry, or civil service. The program of study for a student who plans to enter graduate school will differ from that of a student who intends to accept a position immediately after completing the Bachelor's degree. The intent of the college is to help the student select a career and to prepare him or her for competence and leadership in that career.

Upon admission to the College of Agriculture the student will declare what degree he or she seeks. The following degrees and curricula are available:

Bachelor of Science in Agriculture
- Agricultural Business and Marketing
- Agricultural Science
- Agricultural Technology

Bachelor of Science in Agricultural Engineering
- Agricultural Engineering

Bachelor of Science in Forestry
- Forestry
- Forest Game Management

Bachelor of Science in Home Economics
- General Home Economics
- Clothing and Textiles
- Foods, Nutrition and Industrial Management
- Home Economics Education

The student may select a curriculum and an area of specialization at the time of registration as a freshman or wait until the sophomore year to make these decisions. The student is

assigned an adviser from one of the areas of specialization as follows: Biochemistry, Agricultural Economics, Agricultural Engineering, Agronomy, Animal Science, Botany, Dairy Science, Entomology, Forestry, Home Economics, Horticulture, Mechanized Agriculture, Poultry Science, Pre-Veterinary, or Teacher Preparation in Agriculture.

The College of Agriculture, through its various departments, offers the superior student the opportunity to participate in an Honors Program. Participation in the Honors Program is by invitation of a faculty member with the approval of the department concerned and the Dean of the College. It is limited to those students entering the sophomore year with at least a 3.0 average.

For a Bachelor of Science degree in Agriculture, Forestry, or Home Economics, each candidate must complete 136 semester credits; for a Bachelor of Science degree in Agricultural Engineering, 144 semester credits are required.

Thompson School of Agriculture

The Thompson School of Agriculture, a unit of the College of Agriculture, offers a two-year program of study on the technician level. Any high school graduate of good character, with reasonably good grades and a real interest in agriculture, may be admitted. Two years of class work on campus plus two summers of supervised agricultural placement are required for graduation.

Instruction is designed to prepare students for careers in the broad field of agriculture including: production; conservation; agricultural manufacturing, processing, distribution, and marketing; forest technician; research technician; and in numerous other areas where a good background in the plant and animal sciences is desirable. The Thompson offers major fields of study in General Agriculture; Agricultural Business; Animal Science, with areas of specialization in Animal, Dairy, and Poultry Husbandry; Horticulture; Forest Technology; and Soil and Water Conservation Technology.

Applicants desiring admission to Forest Technology and Soil and Water Conservation Technology must submit two units in college preparatory mathematics. Applicants for admission to the other major fields of study will find biology, chemistry, and mathematics helpful prerequisites for their courses in the plant and animal sciences. It is recommended that each prospective applicant take the College Board Scholastic Aptitude Test during his senior year in high school.

The College of Liberal Arts

The College of Liberal Arts seeks to provide students with an understanding of the fundamental fields of knowledge and to develop the student's critical judgment and creative abilities. The College believes that, through a liberal education, a student may achieve an understanding of the heritage of civilization and the realities of the present which will provide perspective and intellectual strength in meeting obligations to the future.

Within this context, the student may pursue a broad, liberal education in the *General Liberal Arts* program or more specialized training in the *Prescribed Curricula* and *Teacher Preparation* programs. The degree of *Bachelor of Arts* is conferred upon students who complete successfully the General Liberal Arts program. The degree of *Bachelor of Science* is conferred upon students who complete successfully the requirements of the Prescribed Curricula. Each student must complete 128 semester credits and maintain an average of C to become a candidate for a degree. Upon admission to the College, a student is assigned an adviser who assists him in developing an individual program best suited to his ability and interests.

General Liberal Arts

The General Liberal Arts program offers the student an opportunity to achieve a sound liberal education. The student's first two years are devoted to gaining a breadth of knowledge through acquaintance with the content and ways of thinking in several disciplines: the biological and physical sciences, the humanities, and the social sciences. In his last two years, the student is encouraged to develop his individual interests and skills through concentration in a particular subject or field of knowledge. Such concentration is the first step toward acquiring specialized knowledge and professional training. Beyond the General Liberal Arts major requirements, a student has the opportunity to select from among a wide variety of courses in developing a program suited to his individual interests.

In his first year, a student's schedule in the General Liberal Arts program includes an introduction to contemporary civilization, a course in composition and literature, and either biology or a course in physical science chosen from specified courses in chemistry, geology, mathematics, physical science, or physics. His fourth course is an elective. Students often use the elective course to explore the field in which they anticipate enrolling as

a major. Freshmen men and women are required to take physical education. Freshmen men must also take military training.

The second-year student in the General Liberal Arts program selects three of his courses from the following sophomore group requirements, one from each group:

Group I	*Group II*	*Group III*
Introduction to The Arts	Biology	Economics
English Literature	Chemistry	Government
American Literature	Geology	Psychology
Humanities	Mathematics	Sociology
Foreign Languages	Physical Science	
Introduction to Music Literature	Physics	
Philosophy		

In addition, sopomores may schedule one or two elective courses.

Each student who enters the General Liberal Arts program must pass a test of general competence in a foreign language before graduation from the University. Any questions on the nature of this test should be addressed to the Chairman of the Department of Languages.

A student may choose a major at the end of his freshman year or during his sophomore year. A minimum of 24 semester credits is required in the major, although some majors may include one or more additional courses which do not count for major credit. A major may be taken in any of the following areas: The Arts, Biology, Botany, Chemistry, Elementary Education, Education, English, Entomology, General Physical Science, Geology, Government, History and Literature, Foreign Languages and Literatures, Mathematics, Microbiology, Music, Philosophy, Physics, Psychology, Sociology, Speech and Drama, or Zoology.

A student who shows unusual interest and ability in his major field may apply for independent study and honors work. In the social sciences, superior undergraduate students may be admitted to a program leading to the master of arts degree, either in preparation for college teaching or further graduate study in a particular field of knowledge.

Some careers, such as dentistry, law, and library science, require additional study in professional schools. Students who intend to pursue such programs of post-graduate professional education are advised to obtain a baccalaureate degree in the General Liberal Arts program before beginning their professional training.

Business and Professional Training

During the freshman year, students following of the Prescribed Curricula take courses or develop programs of courses very similar to those of students following the General Liberal Arts program. During the first year, those who are going into scientific fields usually take two sciences instead of one. To provide breadth of experience for students following a prescribed curriculum, one year's work is required in both the humanities and the social sciences. In each of the prescribed curricula, the sophomore, junior, and senior years are devoted, in large part, to required courses directed toward specialized, professional training.

The prescribed curricula are: Medical Technology, Nursing, Occupational Therapy, Pre-Medical, and Social Service. A detailed description of the prescribed curricula in these fields may be found in the University Catalogue.

Medical Technology Curriculum

Public health and medicine depend more and more upon the laboratory, and positions in medical technology are available in hospital laboratories, physicians' and surgeons' clinics, and in health department laboratories. Students take their freshman, sophomore and junior years' work at the University and their last year's work at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. Through the program, the student may qualify for the B.S. degree and examination for the Medical Technologist's certificate administered by the Registry of Medical Technologists of American Society of Clinical Pathologists.

Nursing Curriculum

Any student who is interested in nursing as a career is encouraged to consider the Nursing curriculum. It affords opportunity for examinations for registration as a nurse and enables the student also to secure a college degree. The breadth of training beyond that usually received in a hospital training school is increasingly in demand, particularly for those who aspire to executive or supervisory positions. The student must satisfactorily complete three years of work in residence at the University of New Hampshire, and then graduate from a school of nursing approved by the University. The length of the training period will vary with the several schools of nursing.

Occupational Therapy Curriculum

An ally to the medical profession, occupational therapy is any activity, mental or physical, prescribed by a physician and ad-

ministered by a registered therapist to aid in the recovery or the rehabilitation of the patient. The successful practice of occupational therapy requires not only thorough academic preparation but also suitable personality combined with judgment, dependability, tact, tolerance, patience, and will to serve. Students planning on this curriculum must take a series of qualifying examinations preceding the sophomore year. The results of these will be used in advising the student whether or not he or she may continue in the curriculum. At the completion of the requirements of the curriculum, the student spends a minimum of ten months in student affiliation in approved hospitals or services under the direction of a registered occupational therapist. When this internship is satisfactorily completed, the student is entitled to a Certificate of Occupational Therapy. The student is then qualified to take examination for registry in the American Occupational Therapy Association.

Pre-Medical Curriculum

Young men and women who are interested in careers as physicians or surgeons may select the Pre-Medical curriculum. Students who successfully complete this curriculum will be eligible for admission to Class A medical schools. However, owing to the large number of applicants for admission to medical schools, usually only those students who stand in the upper third of their class can expect to be admitted.

Social Service Curriculum

The Social Service curriculum offers pre-professional training leading to work in the following fields: family case work, child care and placement, settlement and neighborhood house, institutional work for defectives and dependents, state and local welfare work, probation, correctional school and prison service, Y.M.C.A. and Y.W.C.A. service, municipal playground direction, child guidance clinics, community chest work.

Teacher Preparation

Students may prepare for teaching in the secondary schools of New Hampshire and neighboring states either in a General Liberal Arts major or in one of the specialized teacher preparation curricula.

Only those preparing to teach in the elementary schools will be majors in Education. These students will spend three years in the General Liberal Arts curriculum, with the senior year devoted to professional study and practice teaching. Most of those

planning to teach in the secondary schools will major in a particular subject-matter area, such as biology, government, history etc. Professional courses for state certification are taken as electives.

Those students who are interested in the specialized areas of art, music, or physical education may complete the requirements for the Bachelor of Science degree in one of these prescribed curricula. Women who desire to prepare themselves as playground directors, etc., may elect to follow the Recreation Option within the Physical Education Teacher Preparation program.

All these curricula include educational psychology, principles of learning, principles of teaching, principles of education, subject area methods courses, and supervised teaching. Prescribed programs of study for preparing teachers in art, music, and physical education may be found in the University Catalogue.

The College of Technology

The College of Technology offers several programs of study in the areas of engineering, physical sciences, and mathematics. The Bachelor of Science degree is awarded after successful completion of specific curricula in Chemical Engineering, Chemistry, Civil Engineering, Mathematics, Mechanical Engineering, and Physics. While mathematics and the physical sciences form the core of each of these curricula, work in the humanistic-social and life science areas is also either required or available as electives, since the College feels that a knowledge of the social structure in which the professional-scientific effort is to be used is vitally important.

The freshman year for all students in the College of Technology is the same. While students are asked to elect a departmental area for advisory purposes, it is possible to transfer to other curricula without loss of credit or time during the year. Specific courses during the first year include mathematics, English, general chemistry, engineering drawing, physics, and a course in the humanities.

In the sophomore year all Technology students continue their studies in mathematics, including differential equations and physics. The curricula of all departments include also the opportunity for an elective sequence in the humanistic-social area. Engineering students further add to their core of basic courses, statics and dynamics of mechanics, fluid mechanics, and thermodynamics.

The junior and senior years provide further sequence opportunities in the professional disciplines, as outlined in the paragraphs which follow.

Chemical Engineering

This field is that branch of engineering which involves the application of chemistry, physics, mathematics, and fundamental engineering principles to the design, construction, and operation of equipment for carrying out chemical processes on an industrial scale at the lowest possible cost. Courses include quantitative analysis, organic chemistry, physical chemistry, chemical engineering principles, chemical engineering economics and plant design, chemical engineering thermodynamics, metallography, chemical engineering project, and fundamentals of electrical engineering.

Chemistry

This curriculum is intended to prepare the student for the career of a professional chemist in industry and to give a good foundation for graduate study leading to original and independent research. Courses include organic and inorganic chemistry, analytical chemistry, physical chemistry, German, and a study of chemical literature. A thesis is required.

Civil Engineering

The profession of civil engineering, the oldest of the major branches of engineering practice, embraces the functions of planning, design, and construction of buildings, bridges, dams, transportation projects, and public works in general. Courses include surveying, strength of materials, engineering materials, theory of determinate and indeterminate structures, steel design, electrical engineering fundamentals, general geology, highway engineering and transportation, soil mechanics, reinforced concrete design, structural engineering, hydraulic and sanitary engineering.

Electrical Engineering

This curriculum provides instruction intended to prepare the student for graduate study or to begin his career in professional electrical engineering. Courses include electromagnetics, electric circuits and networks, electronics, control systems and servomechanisms, engineering materials, thermodynamics, fields, engineering economics.

Mathematics

The Technology curriculum in Mathematics consist of a thorough grounding in calculus, followed by advanced work in algebra, analysis, applied mathematics, and geometry. Such a program meets the requirements currently set by graduate schools for admission to graduate study in mathematics. It also furnishes the basic mathematical traning required of mathematicians in industry and government. Courses include mathematical statistics, advanced calculus, higher algebra, mathematical analysis, differential geometry, topology, theory of differential equations, French, and German.

Mechanical Engineering

The Mechanical Engineering curriculum is intended to prepare young men and women either for graduate study or to enter the field of professional mechanical engineering. Training is provided in the organization and utilization of principles, personnel, and physical resources for the solution of mechanical engineering problems. Courses include manufacturing processes and design, electrical engineering, engineering materials, machine design and analysis, heat and power systems, engineering economics.

Physics

The Technology curriculum in Physics is intended to offer basic training in fundamentals, supplemented by laboratory work in the various branches of physics. Such a curriculum prepares its graduates for basic research in industry, the various government research organizations, or for continued academic study toward advanced degrees. Courses include advanced calculus, physical mechanics, electricity and magnetism, experimental physics, atomic physics, nuclear physics, theoretical physics, and German.

All curricula in the College of Technology also provide opportunities for technical elective courses selected from the major field of study of the student or from other departments in the College of Technology or from the other colleges of the University. Other elective courses must be chosen from the social-humanistic fields.

All departments also offer the superior student an opportunity to participate in an Honors Program. This program allows the student working with his adviser to create a course of study emphasizing advanced work in some selected area or areas allied to his professional choice. Admission is by invitation of the department with consent of the Dean of the College.

The Whittemore School of Business and Economics

The Whittemore School of Business and Economics, formerly a department in the College of Liberal Arts, was established as a separate degree-granting school July 1, 1962.

The basic purpose of the school is to provide a broad academic background, with some professional training, in the disciplines of accounting, business administration, economics, and secretarial studies. Only the work done within these three areas will be under the immediate supervision of the School. As is true generally within the University, students will be permitted, and indeed encouraged, to take a substantial part of their course work in the other colleges. In no sense should the basic purpose of the School be interpreted narrowly. Although upon graduation a student will have a certain degree of professional competence in the field in which he chooses to concentrate, he will shortly discover that from the point of view of his future development substantial familiarity with a myriad of other academic disciplines is necessary.

Students in the School will be able to engage in independent study, if they so qualify, on particular aspects of economics or business administration during their junior and senior years. Other students who are interested in a career in college teaching in economics may, if they are qualified, participate in a special five-year Master's program which is supported by the Ford Foundation's Fund for the Advancement of Education. There also exists the possibility that a student interested either in engineering or the natural sciences on the one hand and economics and business administration on the other may be able to work in both areas, thus giving him a background necessary for a successful career in business administration within the framework of a constantly and rapidly changing technology. A student who is interested in both business administration and agriculture, furthermore, may also find it possible to combine work in those two areas, thus obtaining the background necessary for a business management career in agriculture.

Economics

Students concentrating in Economics will be candidates for a Bachelor of Arts degree. They will be expected to fulfill the requirements set down for general Liberal Arts students, such as the modern language and science requirements. In addition, within their area of specialization, they will be able to take,

among others, courses such as national income analysis, advanced price theory, money and banking, international economics, economic and business statistics, and comparative economic systems.

It should be borne in mind, however, that undergraduate training in Economics by no means qualifies a student as a professional economist. Those students who intend to become professional economists should plan on taking a minimum of three years of graduate work in the discipline after they have obtained their Bachelor's degree. Nevertheless, undergraduate training in Economics does provide an excellent background for graduate training not only in that discipline but in other related disciplines, such as political science and law. If a student should plan on receiving only a Bachelor's degree, he will find that his work in economics will qualify him for many positions in the business community and governmental service.

Business Administration

Students concentrating in Business Administration will be required to take courses in those areas, such as accounting and statistics, with which a business man should be familiar. In addition, they will be able to do work in other subjects such as labor relations, personnel administration, marketing, and corporation finance, among others, in which they happen to be interested and wish to specialize. In the main, however, students in the general Business Administration curriculum will obtain a broad knowledge of business management principles and the problems and available solutions confronting the contemporary business community. Additionally, they will study matters such as the relationship between business and government, the role of the business community in the contemporary American economy, and the contributions which economics as a discipline has to make to business administration.

Upon graduation students will receive the Bachelor of Science degree and will be qualified either to continue with advanced work in business or economics or to become members of the business community. They will find that they have the requisite skills to participate in the business management process and the broad academic background which is becoming ever increasingly important for business success.

Business Administration - Accounting Option

Students electing to concentrate in the Accounting Option will be candidates for the Bachelor of Science degree in Business

Administration. Their program will differ from that of students in the general Business Administration curriculum in that they will devote more time to the study of advanced accounting principles. This study will include cost accounting, intermediate accounting, auditing, and federal tax accounting, among others. In general they will be qualified upon graduation for employment as accountants with either private business firms or public accounting firms. It is also expected that they will have a knowledge of the other aspects of over-all business administration in addition to accounting, as well as a broad background in various related disciplines. A student who elects this option will also find that he is well qualified to do graduate work in either accounting or general business administration.

Hotel Administration

Students concentrating in Hotel Administration will receive basic preparation for careers in professional management and technical specialist positions in the hotel, motel, club, and food service areas. They will be candidates for a Bachelor of Science degree. To insure that graduates know both the basic skills as well as the broad field of hotel administration, each student is required to complete at least two summer programs of on-the-job experience. Additionally, the program of study will include a substantial amount of work in general business management and other courses outside the particular area of hotel administration in order to insure the students' having as broad a professional background as possible.

Secretarial Studies

Because of the complexity of modern business it is becoming more and more evident that the demand for secretaries with a college or university background will continue to increase. Students who elect to concentrate in this program will be candidates for a Bachelor of Science degree. In addition to acquiring the skills necessary for engaging in secretarial work, they will be expected to become acquainted with the several aspects of general business administration as well as with the other relevant academic disciplines. Upon graduation they should find secretarial positions readily available, and after having obtained the requisite experience should be able to move rapidly into an executive secretarial position.

Other Programs of Study

The Graduate School

With the objective of bringing together faculty and qualified students for scholarship and research, the Graduate School has offered instruction since 1903. The graduate student is given opportunity to specialize in some field of knowledge and to develop a maturity of thought and attitude toward his professional field, so that both his professional and cultural life are enhanced. The faculty of the Graduate School is drawn from the three colleges of the University.

Programs leading to the Master's degree and the Doctor of Philosophy degree are available in many departments. Full information may be obtained by writing to the Dean of the Graduate School.

The Summer Session

Courses are offered in six-week and eight-week summer programs to meet the needs of a variety of people, such as teachers and school principals, college students who seek to progress faster or make up deficiencies, and those who wish to take courses for personal interests. The faculty includes members of the three colleges supplemented by specialists from other institutions.

Further information may be obtained by writing to the Director of the Summer Session.

University Extension Service

This arm of the University conducts adult education programs anywhere in the state where there is sufficient demand, making instruction available on a college level. It also takes its classes into industrial plants for specialized technological instruction or it will conduct classes in subjects of general interest. Full informiation may be obtained by writing to the Director of the University Extension Service.

Reserve Officers Training Corps

In cooperation with the Federal Government, the University maintains Reserve Officers Training Corps Army and Air Force units as a part of the program to provide trained reserve officers for the military services. All men students, unless they have already had military service, are required to take military training during their freshman and sophomore years. Advanced ROTC, taken by students interested and chosen during the junior and senior years, prepares the student for a commission as a reserve second lieutenant.

Outside the Classroom

As important as the classrooms and laboratories may be, a great University would be incomplete without cultural activities outside the regular program of instruction.

The center of the University's cultural life is the Library where there are 300,000 books and a collection of more than 2,600 phonograph records. The Library has a branch for plant and animal sciences in Nesmith Hall, one for chemistry in James Hall, and one for engineering in Kingsbury Hall.

The University has several collections housed in various buildings. They include one which illustrates the zoology, geology, entomology, and Americana of New Hampshire; one devoted to more than 500 costumes dating from Revolutionary times; another to fabrics; an extensive china and glass collection; a bird collection; and one devoted to testing machinery used by a New Hampshire professor more than 50 years ago.

An outstanding cultural program in music includes a number of concerts by student vocal and instrumental groups and recitals by several faculty members. In this same field the University sponsors a special concert series each year which brings professional musicians to the campus from the nation's opera and symphony halls. During the past year, for example, this series included the Detroit Symphony Orchestra, the Vienna Octet, Soprano Phyllis Curtin, Baritone Giorgio Tozzi, and Pianist Beveridge Webster.

Drama is offered several times during the year by student groups in the new theater in the Paul Creative Arts Center. The 735-seat theater has been described by an authority as one of the best in the East.

There are many public lectures, both by faculty and off-campus speakers. A Distinguished Lecture Series brings outstanding men of arts, letters, science, and the humanities to the campus. These individuals lecture, meet with classes, and talk informally to student and faculty groups. Alumni, through their annual fund, support an Alumni Visitor program which brings equally prominent men and women to the campus, usually for longer periods, to speak publicly and to meet with classes. Recent visitors in these two series have included Aaron Copland, Justice William O. Douglas, John Kenneth Galbraith, Clement Atlee, Paul Henri Spaak, Henry Cabot Lodge, Norman Cousins, and Hodding Carter.

The Department of The Arts presents a continuously changing program of exhibitions, which are selected to appeal to a variety of interests.

Methods of Admission

UNIVERSITY admissions policy is designed to provide for the admission of those students whose personal record, achievement, aptitude, and motivation demonstrate that they have the qualifications for carrying the desired program satisfactorily.

The University admits in-state residents who have a scholastic record which ranks them in the upper two-fifths of their graduating class, are recommended and/or certified, and have an appropriate college preparatory background. The number of out-of-state students admitted each year is limited and selection is made primarily on the basis of superior academic achievement in secondary school. Such traits as character, leadership, and initiative are taken into account.

All candidates for admission to the University are required to submit the results of the College Entrance Examination Board Scholastic Aptitude Test and the writing sample taken during the senior year.

Applicants should not apply for admission until after the first ranking period of the senior year. Non-residents should apply no later than March 15, while in-state students should apply no later than spring. No application can be considered which is not complete at least by August 12, 1963.

Formal application papers, which must be filed with the Admissions Office, may be obtained from secondary school offices in New Hampshire or from the Admissions Office at the University. A non-refundable tuition fee — $5 for residents of New Hampshire and $15 for non-residents — should be sent with the application.

It is assumed that students from out-of-state will have reasonable financial backing since only limited scholarship aid is available for non-resident applicants.

A word about New Hampshire residence. All applicants living in New Hampshire are required to submit a notarized form containing a statement to the effect that their parents are legally domiciled in the state. Students admitted from states other than New Hampshire or from foreign countries are considered as non-residents throughout their entire attendance at the University unless the parents have gained *bona fide* residence in New Hampshire.

Preparation for College

While 16 units of college preparatory work are strongly recommended, the University will accept 12, including at least four of English, one of natural science, and one of social science. The following minimal specific subject requirements represent the last acceptable, rather than the most desirable college preparatory program:

	Agriculture	*Liberal Arts*	*Technology*
English	4 units	4 units	4 units
Language		2 units of a single foreign language	
Mathematics	2 units	2 units	3½ units, including algebra plane geometry, and trigonometry
Science (2 units to be selected from biology, physics, or chemistry beginning 1965)	1 unit	1 unit	2 units (chemistry and physics)
Social Studies	1 unit	1 unit	1 unit
College Preparatory Electives	4 units	2 units	1½ units

The University participates in the Regional Cooperation Program of the New England Board of Higher Education in which students from other New England states are given priority in certain curricula, as well as special tuition consideration. Information may be obtained from the New England Board of Higher Education, 31 Church Street, Winchester, Mass., or from the admissions offices of the various New England state universities.

Early Decision

The University is willing to give prospective applicants an indication of admission, based on scholastic attainment for three years under certain circumstances. This plan is specifically appropriate for a well-qualified student who has made the University his first choice. Further details may be obtained from the Admissions Office.

Early Admission; Advanced Placement

Secondary school students who show unusual promise may be admitted early to the University. While it does not actively recruit candidates for college entry before graduation from secondary school, the University will, upon recommendation of the school, review the credentials of those whose academic programs have been unusually successful and extensive. Social and emotional maturity also are considered in selecting candidates for early admission.

The University will recognize unusual secondary school work by means of advance placement and credit for those who have taken especially enriched or accelerated courses before entering college. Applicants qualify for such credit by satisfactory achievement on University-approved placement examinations. Further information may be obtained from the Admissions Office.

Special Students

Under special circumstances individuals may be permitted to register for certain courses without having been admitted formally to the University. Normally these individuals are adults whose objective may be realized by taking one or two courses for a semester or two. Such individuals are designated as special students and are not considered to be working toward a degree at the University.

Advanced Standing

Qualified candidates for advanced standing from approved institutions may be admitted. Their status is tentatively determined by the quantity and quality of the work completed at the institution from which they come.

In transfer, credits are allowable for courses which are appropriate to the curriculum for which the student is admitted and for courses in which grades above the lowest passing grade were received.

While the University is pleased to encourage the competent transfer applicant who has valid and legitimate reasons for desiring the transfer to New Hampshire, it cannot encourage the applicant with a history of academic or personal difficulty. University admissions policy restricts consideration for transfer to those students with satisfactory academic, as well as personal, records.

Expenses

THE cost for the freshman year at the University averages about $1,250 for a resident of New Hampshire and $1,700 for a non-resident.

Tuition is $380 ($800 for non-residents). Any student registering for eight credits or more per semester pays the full tuition. Any student registering for fewer than eight credits pays $17.50 per credit hour.

Board is $360. Freshmen are required to board at the Commons Dining Hall. There are cafeterias in the Commons and in the Memorial Union for upperclassmen.

Room rents average $230. The University has nine residence halls for women and seven for men. Undergraduate women are required to live in a residence hall or sorority house unless they live at home. Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of the space available. Room rents vary from $165 to $280.

Books cost about $75. These and classroom supplies may be purchased at the University Bookstore.

There is a Memorial Union assessment of $12 and an activity tax of $10 which includes a subscription to the undergraduate newspaper and yearbook, and membership in Student Union, Student Government, and class activities.

Personal expenses average $200. These will vary with the needs of the individual student, and include clothing, laundry, recreation, incidentals, and travel.

Financial Aid

The financial aid program assists able and promising students who are unable to meet their educational expenses entirely from their own or their family's resources. The Financial Aid Committee suggests one or more of the following ways to assist in meeting college expenses.

Tuition Grants and Scholarships

A full-time student who is a resident of New Hampshire is eligible for consideration for an in-state tuition grant. The amount varies from $100 to full tuition, and the basic consideration is financial need. Non-resident students are eligible to be considered for non-resident tuition grants. Scholastic attainment,

financial need and participation in extra-curricular activities are the principal considerations for this type of grant. There are scholarships available for both resident and non-resident students. The basis of these awards may be either scholastic attainment, meeting particular requirements as outlined by the donor, participation in extra-curricular activities, or other.

No awards are made until a student has been admitted to the University, has submitted an application for a grant or scholarship, and his parents have filed a parents' confidential statement with the College Scholarship Service at Princeton, New Jersey.

In-state students may secure applications for grants or scholarships as well as the parents' confidential statement from high school principals or guidance counselors. Out-of-state and transfer students may secure applications for grants or scholarships from the Financial Aids Office, UNH, and the parents' confidential statement from high school principals or guidance counselors. Applications are due not later than May 1st.

Loans

There are two loan funds administered by the University: the UNH Loan Fund and the National Defense Student Loan Fund. Financial need must be clearly demonstrated and loans may be used only for expenses incurred in pursuing a college education. Applications for loans may be secured from the Financial Aids Office, UNH. Applications are due not later than August 1st.

In many communities scholarships and loans are available locally. School principals and guidance counselors usually have such information.

Employment

Various types of employment are usually available to students wishing to work part time. However, freshmen and transfer students are not encouraged to work during their first semester. Work applications may be secured in the Financial Aids Office, UNH.

For additional information, contact the Financial Aids Office, Thompson Hall.

Student Life on Campus

COLLEGE life is not confined to studying. Likewise the University's concern for the student goes beyond the classroom. Several special services are provided by the University to help the student in his four years on campus. These functions and others of general interest are described briefly in the following paragraphs.

Health

The University Health Service, located in Hood House, includes a well-equipped out-patient clinic for diagnosis and treatment of ambulatory patients and a modern hospital of 26 beds. Registered nurses are on duty at all times, and individual health guidance is given through personal conferences with the University physicians. In addition to the University Health Service, group accident and sickness insurance may be purchased.

Counseling

The Counseling Center is a University service which provides professionally-qualified assistance to students who are dissatisfied with some aspect of their academic functioning or who have personal or emotional problems which interfere with their educational experience. The services of the Counseling Center are not limited to those with "serious" problems but are geared to the needs of the normal college student who seeks to achieve more personal effectiveness and greater self understanding. In addition to the direct help the Center gives to students, the staff is also available to members of the faculty and staff on a consultation basis.

Testing and Placement

Essentially the University's bureau of vocational services, this department assists seniors in securing positions through contacts with prospective employers. Admission and orientation testing is conducted, as well as individual testing for guidance purposes.

Military Service Affairs

Men students reaching their 18th birthday are required to register for Selective Service. The Military Service Affairs officer is the representative of the University in all matters concerning the Selective Service System and the branches of the armed forces.

Memorial Union

The University's Memorial Union is a community center for students. A gift of alumni and friends of the University, it was designed to fulfill three functions: a living memorial to the men and women of New Hampshire who have served in the armed forces, a college union, and a statewide conference center. With its extensive and well planned facilities, it serves as a focus for all extra-curricular activities on the campus.

In addition to its meeting and conference rooms, lounges, music listening and TV rooms, cafeteria, snack bar, games area for table tennis, billiards, and bowling, and its spacious Strafford Room utilized for a variety of social functions, the Union provides permanent headquarters for several major student organizations.

The facilities of the Memorial Union are effectively adapted to the recreational needs of the campus by a well-rounded, leisure-time program of social and cultural activities planned by the various student committees of Student Union.

Religious Activities

Three churches in the town of Durham and a number of student organizations offer the opportunity for students to participate in religious activities.

The Durham Community Church welcomes students to its Sunday services of worship at 9:15 and 11:00 a.m., and to share church activities through student affiliate membership.

The needs of Episcopal students are met by a chaplain who is also rector at St. George's Church. Services are held on Sundays at 8:30 and 10:30 a.m. and 6:00 p.m.

The parish of St. Thomas More serves Roman Catholic members of the community. Sunday Masses are held at 8:00, 10:30, and 11:30 a.m.

These are the student organizations which help to promote religious life on the campus:

Canterbury Club, an association of Episcopal students.

Christian Science Organization, for students of the Christian Science faith.

Hillel Society, an organization of Jewish students. Activities include religious services, holiday observances, discussion groups, and the maintenance of a library relative to Jewish study.

Newman Club, an organization for Catholic students. Its activities include corporate communions, discussion study groups, lectures, drama, parties, and dances. A reading room is provided.

Phanarion Society, an organization for students of the Greek Orthodox Church.

Christian Association, an organization for Protestant students. It is sponsored by the United Protestant Association which represents Protestant churches, parents of students, alumni, faculty, students, and the state YMCA and YWCA. The Christian Association is directed by a full-time chaplain to students.

Inter-Varsity Fellowship, an organization to promote Christian fellowship, Bible study, and prayer.

Office space for the Catholic, Episcopal, and Protestant chaplains and meeting rooms for the religious organizations are provided by the University in New Hampshire Hall.

Books and Supplies

The University Bookstore carries all textbooks, allied reading material, and classroom supplies which students need. The store also has a large selection of paperbacks which are of general interest to college students.

Living Accommodations

The University has nine residence halls for women and seven for men. All rooms are heated, lighted, and furnished. The individual student must furnish his own bed linen, blankets, towels, and desk lamps. Optional linen service and blanket service may be secured through the University Housing Office. A house director is in charge of each residence hall.

All undergraduate women are required to live in a residence hall or a sorority house unless they live at home. Women students are required to be in their residence halls at certain hours in the evening.

Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of space available. There are no curfew hours for men.

The University operates 98 apartments for faculty and married students. A Graduate House, accommodating 31 men and 13 women, also is operated by the University.

Housing applications and contracts are sent to a student at the time of official admittance to the University, and assignments to University residence halls are made during July and August. A notice of room assignment and bill will be sent when assignment is complete. One-half of the year's rent is payable in advance.

Board

All freshmen are required to board at the Commons Dining Hall unless they live at home or work for their meals. The aim of this regulation is to safeguard the health of freshmen by offering skilled dietetic supervision in selection and preparation of

their food. The Commons is equipped with the best appliances for cooking and serving on a large scale. Board for freshmen in 1961-1962 was $180 per semester on the basis of three meals a day, seven days a week.

Cafeterias in the Commons and the Memorial Union are open to all students of the upper classes who may desire to take advantage of the moderate price and high quality of food available. In the Commons cafeteria in 1961-1962, 21-meal weekly tickets were $14.

Personal Cash

Students are urged to arrange personal checking accounts or to place money on deposit in the Business Office until needed in order to avoid possible loss from keeping on hand considerable sums of money. Such banking arrangements will facilitate payment at registration periods. The Business Office will accept and cash student checks.

Student Conduct

The University believes living and learning go hand in hand. Therefore, student behavior which detracts from this central purpose will be discouraged, while behavior which seriously threatens it will not be tolerated. For these reasons and for their own human and social value, high standards of personal conduct are expected of students both on and off campus. Any student who is unwilling or unable to meet these standards will be asked to leave the University.

No attempt is made to spell out all types of misconduct. The University relies instead on the good taste and maturity of college students and on their assumption of full adult responsibility for the consequences of their acts.

Motor Vehicles

Student use of motor vehicles is not encouraged, but it is recognized that there may be important reasons why a student needs to have his own transportation on campus.

Operation of motor vehicles is restriced to juniors, seniors, and graduate students; married students; legal residents of Durham; those who commute from off campus; students with a serious physical handicap; and second-year students in the Thompson School of Agriculture.

All motor vehicles must be registered with the University. There are two kinds of registration: a $5 permit which allows use of certain campus parking facilities, and a free permit which allows use of the vehicle in Durham but not on campus. There are fines for violations of regulations.

Student Activities

THERE are many opportunities for students to participate in activities outside the classroom. They include athletics, dramatics, music, publications, student government, and social organizations. If there is a good balance between work in the classroom and work in activities, the whole college experience will be enriching. Without attempting to enumerate all of the activities, a few of the general areas are noted.

Athletics

New Hampshire students, both men and women, are encouraged to participate in intercollegiate sports or in intramural events. The athletic program stresses physical fitness, as well as the development of sportsmanship and a keen competitive spirit.

Varsity sports, with intercollegiate schedules, include football, cross country, basketball, hockey, winter track, skiing, baseball, lacrosse, spring track, golf, and tennis. The University belongs to the Yankee Conference. There are freshman teams with scheduled competition in most of these sports.

For women students there is intercollegiate competition in field hockey, basketball, skiing, badminton, tennis, and lacrosse.

There are comprehensive intramural and club programs for those who do not participate in the intercollegiate programs. For men there are opportunities for team play in touch football, fall and spring track, bowling, volleyball, basketball, tennis, golf, and softball. Women students may participate in dance club, rifle club, square dancing, skating, skiing, and riding club.

The intercollegiate and intramural programs are in addition to the required physical education courses which all students must take.

Dramatics

The theater in the new Paul Creative Arts Center has been described as one of the best educational theaters in the East. It provides students with an opportunity to participate in an extensive program in drama production under the sponsorship of the Department of Speech and Drama. The student dramatic society, Mask and Dagger, presents three full-length plays each year, as well as a number of shorter productions. The drama experience includes play-writing, acting, directing, costuming, make-up, lighting, staging, and design.

Music

Music for fun and music for credit is part of the offering of the Department of Music. There are opportunities in a variety of ways for students to sing, play, and conduct. There are two glee clubs and a choir. There are two bands, a symphony orchestra, a string ensemble, and several instrumental and vocal ensembles.

Two major music programs are produced each year: the Christmas Concert and the Spring Concert. The latter usually is devoted to one major classical work. In addition, each musical unit presents a special concert during the year. There are recitals by senior music majors and by the faculty of the Department of Music.

Publications

New Hampshire students have their own weekly newspaper, *The New Hampshire*, and an illustrated annual, *The Granite*, published by the senior class.

Student Government

This organization, to which all undergraduate students belong, acts as the official representative body for the students and coordinates the activities of the student body with the faculty. The purpose of Student Government is to promote individual and collective responsibility among students.

The work of Student Government is carried on by the Student Senate, chosen from all housing units and the commuting students.

Other Organizations

There are about 40 recognized student organizations for those interested in some special academic field, such as chemistry or sociology, or in non-academic activities, such as skiing and hiking, dramatics, music, or radio. Included are some 20 national honorary societies, among them Phi Beta Kappa and Phi Kappa Phi.

Fraternities and sororities are an important part of campus life. There are 14 fraternities and 6 sororities. Most of them have their own homes in which the members live.

The Campus

UNIVERSITY lands in Durham comprise approximately 1,700 acres, largely in farms and woodlots. The main campus occupies about 170 acres. Main Street of Durham divides the campus roughly in half. South of it are the men's dormitories, administrative offices, and all major classroom buildings; to the north are the women's dormitories and the fraternity and sorority houses.

The oldest building on campus is Thompson Hall (1892), the administration building. Approximately one-half of the University's physical plant was completed before World War II; most of these buildings follow a modified Georgian style of architecture. The newer buildings are contemporary in design. The effect is a harmonious one, however, and the visitor's impression is that the campus belongs to the tradition of New England.

Since 1949 the University has doubled the capacity of its educational plant. This building program will continue without pause until 1972 when the campus will have reached peak utility for a student body of about 7,000, nearly double its present size. Newest of the buildings are the Paul Creative Arts Center, a $2,250,000 structure which houses music, the arts, and drama, and the Spaulding Life Science Building, housing bacteriology, biochemistry, and zoology. Both were opened in 1960.

Also erected since World War II have been the University's engineering building, the Memorial Union recreation center, University Library, a nutrition laboratory, nine dormitories, and a housing development for married students and faculty. Under construction are a new dining hall and a women's dormitory.

Bulletin of the University of New Hampshire

Catalogue Issue for 1963-1964

Vol. LIV April 1963 No. 10

The Bulletin of the University of New Hampshire is published three times in January, twice in November and December, and once in September, March, and April. Second-class postage paid at Durham, N. H.

Foreword

This issue of the Bulletin of the University of New Hampshire provides a detailed description of curricula, courses, and requirements for study at the University.

Other information about the University — its history, its general philosophy and objectives, its buildings and equipment, its student personnel services, student organizations, methods of admission, and student fees and expenses — will be found in the *General Information 1963-1964* issue of the Bulletin.

Detailed information about financing an education at the University may be obtained by writing to the Financial Aids Office, Thompson Hall.

Contents

University Calendar 4

Board of Trustees 6

Officers of Administration 7

Administrative Staff 8

The University Faculty and Staff 10

Methods of Admission 40

University Academic Requirements 42

University Fees and Expenses 42

The College of Agriculture 45

The College of Liberal Arts 66

The College of Technology 107

The Whittemore School of Business and Economics 120

The Graduate School 135

Description of Courses 136

Summary of Registration 235

University Calendar

Summer Session

1963

June 24	Monday	Registration, eight-week session and first four-week session
June 25	Tuesday	Classes begin
July 8	Monday	Registration, six-week session
July 9	Tuesday	Classes begin
July 19	Friday	First four-week session ends
July 22	Monday	Registration, second four-week session
July 23	Tuesday	Classes begin
Aug. 16	Friday	Summer Session ends

First Semester

1963

Sept. 11	Wednesday	2 p.m. Residence halls open for incoming freshmen
Sept. 12	Thursday	9 a.m. Testing of freshmen who missed summer tests
Sept. 12-17	Thursday-Tuesday	Orientation
Sept. 12	Thursday	First faculty meeting
Sept. 15	Sunday	2 p.m. Residence halls open for upperclassmen
Sept. 16	Monday	8 a.m.-5 p.m. Registration
Sept. 17	Tuesday	8:45 a.m. Convocation
Sept. 18	Wednesday	8 a.m. Classes begin
Sept. 27	Friday	4:30 p.m. Last day to add most courses
Oct. 15	Tuesday	4:30 p.m. Last day to drop most courses
Nov. 4	Monday	9 a.m. Mid-semester reports due
Nov. 26	Tuesday	7 p.m. Residence halls close for Thanksgiving recess
Dec. 1	Sunday	2 p.m. Residence halls reopen
Dec. 2	Monday	8 a.m. Classes resume
Dec. 20	Friday	7 p.m. Residence halls close for Christmas vacation

1964

Jan. 5	Sunday	2 p.m. Residence halls reopen
Jan. 6	Monday	8 a.m. Classes resume
Jan. 18	Saturday	8 a.m. Final examinations for Semester I begin
Jan. 25	Saturday	5:30 p.m. Final examinations end. Residence halls close at 7 p.m.

Second Semester

Feb. 2	Sunday	2 p.m. Residence halls open for Semester II
Feb. 3	Monday	8 a.m.-6 p.m. Registration
Feb. 4	Tuesday	8 a.m. Classes begin

Feb. 13	Thursday	4:30 p.m. Last day for adding most courses
Mar. 3	Tuesday	4:30 p.m. Last day for dropping most courses
Mar. 16	Monday	9 a.m. Mid-semester reports due
Mar. 27	Friday	7 p.m. Residence halls close for Easter vacation
Apr. 5	Sunday	2 p.m. Residence halls reopen
Apr. 6	Monday	8 a.m. Classes resume
May 23	Saturday	8 a.m. Final examinations for Semester II begin
June 1	Monday	5:30 p.m. Final examinations end. Residence halls close at 7 p.m.
June 7	Sunday	Commencement Day

Board of Trustees

His Excellency, Governor John W. King, A.B., M.A., LL.B., *ex officio*

Frank T. Buckley, Commissioner of Agriculture, *ex officio*

President John W. McConnell, B.A., PH.D., D.SC., *ex officio*

*Forrest M. Eaton, B.S., President — Portsmouth, N. H.
July 1, 1959 to June 30, 1963

*Dean P. Williamson, B.S., Vice President — Concord, N. H.
July 1, 1960 to June 30, 1964

Bradford S. Boothby, B.S., Secretary — Union, N. H.
October 14, 1959 to June 30, 1963

Frank W. Randall, B.S., LL.D. — Portsmouth, N. H.
July 1, 1936 to June 30, 1964

Mary S. Brown — Center Sandwich, N. H.
December 20, 1944 to June 30, 1963

Maurice F. Devine, A.B., LL.B., LL.D. — Manchester, N. H.
December 21, 1949 to June 30, 1966

J. Fred French — Manchester, N. H.
April 12, 1961 to June 30, 1965

Sinclair Weeks, A.B., LL.D. — Lancaster, N. H.
October 31, 1961 to June 30, 1965

J. Arthur Tufts, B.S., M.ED. — Exeter, N. H.
September 28, 1962 to June 30, 1965

Jean A. Wagner, B.A. — Hampton Falls, N. H.
December 14, 1962 to June 30, 1966

---

* Elected by alumni

Officers of Administration

John W. McConnell, *President*

Jere A. Chase, *Executive Vice President*

Robert N. Faiman, *Dean of the College of Technology and Director of the Engineering Experiment Station*

Harry A. Keener, *Dean of the College of Agriculture and Director of the Agricultural Experiment Station*

Allan A. Kuusisto, *Dean of the Graduate School and Coordinator of Research*

Robert F. Barlow, *Dean of the Whittemore School of Business and Economics*

Everett B. Sackett, *Dean of the College of Liberal Arts*

Norman W. Myers, *Treasurer*

C. Robert Keesey, *Dean of Students*

Elizabeth A. McQuade, *Associate Dean of Students*

Donald E. Vincent, *Librarian*

Harry R. Carroll, *Director of Admissions*

Owen B. Durgin, *Registrar*

Samuel W. Hoitt, *Director of the Cooperative Extension Service*

Alfred T. Quirk, *Director of University Extension Service and Director of Summer Session*

Administrative Staff

George W. Bamford, *Alumni Fund Director*

John D. Bardwell, *Audio-Visual Coordinator, University Extension Service*

Ronald C. Barrett, *Director of Memorial Union*

Ernest W. Beals, *Assistant Director of Admissions*

Doris Beane, *Assistant for Institutional Studies*

Kathleen R. Beckingham, *Counselor*

Richard M. Brayton, *Director of Physical Plant Development*

Burnell V. Bryant, *Alumni Executive*

Robert G. Congdon, ed.d., *Counselor*

Henry W. Corrow, Jr., *Extension Editor*

William D. Crandall, m.d., *Assistant Director of University Health Service*

John E. Enos, *Assistant News Editor*

Francis H. Gordon, *Manager, University Housing*

Jane E. Griswold, *Director of Dining Services*

L. Franklin Heald, *Director of Informational Services*

Dayton M. Henson, *Manager, University Bookstore*

Charles H. Howarth, m.d., *Director of University Health Service*

Frederick M. Jervis, ph.d., *Director of Counseling*

Herbert E. Kimball, *Business Manager*

Reginald W. King, *Manager, Printing Service*

Eugene H. Leaver, *Assistant Superintendent of Properties and Supervising Architect*

Harold I. Leavitt, *Superintendent of Properties*

William W. Lothrop, ph.d., *Counselor*

W. Kent Martling, *Assistant Treasurer*

Paul H. McIntire, ed.d., *Director of Testing and Placement*

Harriet B. Nason, r.n., *Supervising Nurse*

Keith J. Nighbert, *Station Manager of WENH-TV, Channel 11*

Mary Lou O'Donnell, *Assistant Director of University Extension Service and Conference Coordinator*

Ronald W. Olmstead, *Controller*

Richard C. Plumer, *News Editor*

Frank W. Poland, *Director of Non-Academic Personnel*

Mary Semitros, *Alumni Recorder*

Russell C. Smith, *Purchasing Agent*

Jane B. Stearns, *Financial Aids Officer*

Albert D. Van Allen, *Director of University Development and Public Relations*

The University Faculty and Staff

As of February 1, 1963

ABELL, MAX F., *Extension Associate Professor Emeritus of Agricultural Economics*
B.S., Cornell University, 1914; Ph.D., *ibid.*, 1924. (1926-)

BABCOCK, DONALD C., *Professor Emeritus of Philosophy*
B.A., University of Minnesota, 1907; M.A., *ibid.*, 1908; S.T.B., Boston University, 1912; D.H.L. (Hon.), University of New Hampshire, 1960. (1918-)

BATCHELDER, LYMAN J., *Instructor Emeritus in Mechanical Engineering, Woodshop* (1915-)

BEGGS, ANN F., *Extension Associate Professor Emeritus of Home Economics*
B.S., Nasson College, 1947. (1917-)

BEVAN, LAURENCE A., *Director Emeritus of the Cooperative Extension Service*
B.S., Massachusetts Agricultural College, 1913. (1946-)

BOWLER, EDMOND W., *Professor Emeritus of Civil Engineering*
S.B., Massachusetts Institute of Technology, 1914. (1920-)

BOWLES, ELLA S., *Publications Editor Emeritus*
Plymouth Normal School, 1905. (1943-)

BRACKETT, THELMA, *University Librarian Emeritus*
A.B., University of California, 1919; Certificate, California State Library School, 1920; DH.L. (Hon.), University of New Hampshire, 1962. (1942-)

CAMPBELL, WILLIS C., *Research Associate Emeritus, Engineering Experiment Station*
B.S., New Hampshire College, 1906. (1938-)

CARROLL, HERBERT A., *Professor Emeritus of Psychology*
A.B., Bates College, 1923; A.M., Brown University, 1928; Ph.D., Columbia University, 1930. (1941-)

COULTER, CHARLES W., *Professor Emeritus of Sociology*
B.A., University of Toronto, 1903; B.D., Victoria College, 1909; M.A., Yale University, 1910; Ph.D., *ibid.*, 1914. (1934-)

ELLIS, ELIZABETH E., *Extension Associate Professor Emeritus of Home Economics*
B.S., Teachers College, Columbia University, 1927; M.A., *ibid.*, 1929. (1929-)

HENNESSY, WILLIAM G., *Professor Emeritus of English*
A.B., Boston University, 1916; A.M., *ibid.*, 1924. (1923-)

---

* Indicates part time devoted to Cooperative Extension Service.
† Indicates part time devoted to Agricultural Experiment Station.

HITCHCOCK, LEON W., *Professor Emeritus of Electrical Engineering*
B.S., Worcester Polytechnic Institute, 1908. (1910-)

HOWES, HORACE L., *Professor Emeritus of Physics*
B.S., Syracuse University, 1905; Ph.D., Cornell University, 1915. (1918-)

HUDDLESTON, ERIC T., *Professor Emeritus of Architecture*
B.Arch., Cornell University, 1910. (1914-)

JACKSON, C. FLOYD, *Professor Emeritus of Zoology*
B.A., De Pauw University, 1905; M.S., Ohio State University, 1907; D.Sc. (Hon.), University of New Hampshire, 1961. (1908-)

LATIMER, L. PHELPS, *Associate Professor Emeritus of Horticulture*
B.S., University of California, 1921; M.S., *ibid.*, 1922; Ph.D., *ibid.*, 1926. (1926-)

MILLS, MARIAN E., *Assistant Professor Emeritus of Botany*
B.S., Teachers College, Columbia University, 1917; M.A., *ibid.*, 1920. (1927-)

O'BRIEN, DANIEL A., *County Agent Leader Emeritus*
B.S., Cornell University, 1913 (1920-)

O'CONNELL, ELIAS M., *Instructor Emeritus in Mechanical Engineering*
Graduate, Wentworth Institute, 1923; Graduate, two-year course in pattern making, *ibid.*, 1925. (1925-)

†O'KANE, WALTER C., *Professor Emeritus of Economic Entomology*
B.A., Ohio State University, 1897; M.A., *ibid.*, 1909; D.Sc. (Hon.), *ibid.*, 1932. (1909-)

PARKER, CLIFFORD S., *Professor Emeritus of Languages*
A.B., Harvard University, 1912; A.M., *ibid.*, 1914; Ph.D., Columbia University, 1925. (1931-)

PERRY, ERROL C., *Assistant Professor Emeritus of Farm Management, Thompson School of Agriculture*
B.S., Massachusetts State College, 1920. (1929-42, 1946-)

†PHILLIPS, THOMAS G., *Professor Emeritus of Agricultural and Biological Chemistry*
B.S., Ohio State University, 1912; M.S., *ibid.*, 1913; Ph.D., University of Chicago, 1918. (1925-)

†PRINCE, FORD S., *Professor Emeritus of Agronomy and Agronomist Emeritus, Agricultural Experiment Station and Cooperative Extension Service*
B.S., University of Illinois, 1913. (1925-)

*RASMUSSEN, EDWIN J., *Extension Professor Emeritus of Horticulture*
B.S., University of Wisconsin, 1927; M.S., *ibid.*, 1929. (1929-36, 1947-)

SANBORN, MARY L., *Assistant State Club Leader Emeritus*
Oread Institute. 1904. (1915-)

SEIBERLICH, JOSEPH, *Research Professor Emeritus, Engineering Experiment Station*
Diploma Ingenieur, Technical University, Karlsruhe, Germany, 1924; Doctor Ingenieur, *ibid.*, 1928. (1941-)

SMITH, LUCINDA P., *Associate Professor Emeritus of English*
A.B., Colby College, 1901; M.A., Boston University, 1934. (1919-)

†SMITH, TODD O., *Research Assistant Professor Emeritus of Agricultural and Biological Chemistry*
A.B., Indiana University, 1910; M.S., New Hampshire College, 1917. (1910-)

STEVENS, HENRY B., *Director Emeritus of University Extension Service*
A.B., Dartmouth College, 1912. (1913-)

SWASEY, HENRY C., *Associate Professor Emeritus of Physical Education and Athletics for Men*
B.S., Amherst College, 1915; M.S., Indiana University, 1941. (1921-)

TAYLOR, FREDERICK W., *Director Emeritus of Agricultural Service Departments of the College of Agriculture*
B.S., Ohio University, 1900. (1903-)

THAMES, SARAH, Associate *Professor Emeritus of Home Economics*
B.S., Simmons College, 1930; M.A., Teachers College, Columbia University, 1942. (1945-)

TONKIN, JOHN C., *Instructor Emeritus in Mechanical Engineering, Machine Shop* (1910-12, 1924-)

WALSH, JOHN S., *Professor Emeritus of Languages*
A.B., Harvard University, 1915; A.M., Boston University, 1928. (1922-)

YALE, WILLIAM, *Professor Emeritus of History*
Ph.B., Sheffield Scientific School, Yale University, 1910; M.A., University of New Hampshire, 1928. (1928-)

ABBOTT, HELEN D., *Head Cataloger*
A.B., Wheaton College, 1929; S.B., in L.S., Simmons College, 1930; A.M., Middlebury College, 1936. (1943-)

ABBOTT, MARGUERITE, *Associate Professor of Occupational Therapy*
Certificate, OTR, Boston School of Occupational Therapy, 1932; B.S., Tufts University, 1948; M.A., Columbia University, 1957; A.P.D.Ed., *ibid.*, 1961. (1961-)

AGENBROAD, JAMES E., *Cataloger*
A.B., Miami University, 1956; M.L.S., Rutgers University, 1960. (1960-)

†ALLEN, FRED E., *Professor of Poultry Science and Veterinarian, Agricultural Experiment Station*
B.S., University of New Hampshire, 1932; D.V.M., Ohio State University, 1936. (1940-)

†ALLEN, PETER H., *Assistant Professor of Forestry*
B.S., University of New Hampshire, 1956; M.A., Duke University, 1958. (1960-)

ALLISON, RICHARD C., *Instructor in Forestry Technology*
B.S., Pennsylvania State University, 1957; M.F., *ibid.*, 1960. (1962-)

ALLMENDINGER, E. EUGENE, *Associate Professor of Mechanical Engineering*
B.S., Nav. Arch., University of Michigan, 1941; M.S., Mech. Eng., University of New Hampshire, 1950. (1958-)

Alssen, Nicholas E., *Assistant Professor of Foreign Languages and Literatures*
A.M., University of Michigan, 1953. (1961-)

Amell, Alexander R., *Professor of Chemistry*
B.S., University of Massachusetts, 1947; Ph.D., University of Wisconsin, 1950. (1955-)

Andersen, Kenneth K., *Assistant Professor of Chemistry*
B.S., Rutgers University, 1955; Ph.D., University of Minnesota, 1959. (1960-)

Anderson, Charlotte K., *Assistant Librarian and Documents Librarian*
B.A., University of Michigan, 1935; A.B.L.S., *ibid.*, 1936; A.M.L.S., *ibid.*, 1951. (1943-)

Anderson, Paul S., *Instructor in Chemistry*
B.S., University of Vermont, 1959. (1961-)

†Andrews, Richard A., *Assistant Professor of Agricultural Economics*
B.S., University of Maine, 1949; M.S., Pennsylvania State University, 1951; Ph.D., University of Minnesota, 1959. (1959-)

Annis, William H., *Assistant Professor of Agricultural Education and Teacher Trainer*
B.S., University of Maine, 1951; M.Agric.Ed., University of New Hampshire, 1959; Ed.D., Cornell University, 1961. (1962-)

Atwood, Janet, *Assistant Professor of Physical Education for Women*
B.S., Skidmore College, 1950; M.A., State University of Iowa, 1955. (1962-)

Baier, Lee S., *Instructor in English*
B.A., Reed College, 1948; M.A., Columbia University, 1952. (1960-)

Ballard, Horace C., *Agricultural Agent, Belknap County*
B.S., Cornell University, 1936. (1949-)

Balomenos, Richard H., *Assistant Professor of Mathematics*
B.S., United States Merchant Marine Academy, 1952; M.A., New York University, 1956; Ed.D., Harvard University, 1961. (1961-)

Bardsley, Elizabeth S., *Extension Home Economist, Belknap County*
B.S., University of Maryland, 1953. (1962-)

Bardwell, John D., *Audio-Visual Coordinator and Lecturer in Education*
A.A., Boston University, 1950; B.S., Gorham State Teachers College, 1952; M.Ed., University of New Hampshire, 1955. (1960-)

Barlow, Robert F., *Dean of the Whittemore School of Business and Economics and Professor of Economics*
B.A., Colby College, 1950; M.A., Fletcher School of Law and Diplomacy, 1951; Ph.D., *ibid.*, 1960. (1962-)

Barraclough, Kenneth E., *Extension Professor of Forestry*
B.S., New York State College of Forestry, Syracuse University, 1921; M.F., Harvard University, 1940. (1926-)

Barrett, James P., *Assistant Professor of Forestry*
B.S., North Carolina State College, 1954; M.F., Duke University, 1957; Ph.D., *ibid.*, 1962. (1962-)

Bartley, Clara H., *Research Associate in Microbiology*
B.S., Miami University, 1923; M.A., University of Michigan, 1926; Ph.D., University of Kansas, 1935. (1945-)

Bartley, Irving D., *Assistant Professor of Music and University Carillonneur*
B.M., Syracuse University, 1935; M.M., *ibid.*, 1938. (1945-)

Barton, Philip S., *Professor of Animal Science and Director, Thompson School of Agriculture*
B.S., University of New Hampshire, 1928; M.Ed., *ibid.*, 1938. (1939-)

Bassett, John H., *Instructor in Business and Economics*
B.S. in B.A., Boston University, 1959; A.M., *ibid.*, 1960. (1960-)

Batchelder, Gerald M., *Research Associate Professor, Engineering Experiment Station*
B.S., University of New Hampshire, 1950; M.S.C.E., Purdue University, 1952. (1953-)

Batcheller, Joseph D., *Associate Professor of Speech and Drama*
A.B., Carnegie Institute of Technology, 1936; A.M., University of Minnesota, 1938; Ph.D., *ibid.*, 1942. (1944-)

Batho, Edward H., *Associate Professor of Mathematics*
B.S., Fordham University, 1950; M.S., University of Wisconsin, 1952; Ph.D., *ibid.*, 1955. (1960-)

Beasley, Wayne M., *Research Assistant Professor, Engineering Experiment Station*
S.B., Harvard College, 1945. (1957-)

Beckett, John A., *Professor of Management*
B.S., University of Oregon, 1939; M.B.A., Harvard University, 1946. (1962-)

Beckwith, Marion C., *Director and Professor of Physical Education for Women*
A.B., Oberlin College, 1935; M.Ed., University of New Hampshire, 1937. (1935-)

Belford, Harriet F., *Instructor in Physical Education for Women*
B.S., University of New Hampshire, 1954. (1961-)

Belford, Robert E., *Major, Assistant Professor of Military Science*
B.S., University of New Hampshire, 1950. (1959-)

Bell, R. Virginia, *Assistant Professor of Occupational Therapy*
B.S., University of Michigan, 1953; Certificate O.T.R., Boston School of Occupational Therapy, 1955. (1958-)

Benson, Sandra J., Assistant County Club Agent, Merrimack County
B.S., University of New Hampshire, 1962. (1962)

Berger, Stanley I., *Assistant Professor of Psychology*
B.A., Brooklyn College, 1950; M.A., Kansas University, 1955; Ph.D., *ibid.*, 1957. (1959-)

Bergeron, John A., *Assistant Professor of Economics*
B.A., Merrimack College, 1954; Ph.D., Massachusetts Institute of Technology, 1959. (1960-)

Billis, Mitchell J., *Instructor in Mathematics*
B.M.E., Clarkson College, 1958; M.S., University of New Hampshire, 1962. (1962-)

Bingham, Sylvester H., *Professor of English*
A.B., Dartmouth College, 1922; A.M., Harvard University, 1929; Ph.D., Yale University, 1937. (1936-)

Blanchard, Fletcher A., Jr., *Associate Professor of Electrical Engineering*
B.S., Union College, 1948; M.S. in E.E., Lehigh University, 1950. (1950-)

Bleich, Arthur H., *Instructor in Journalism and Special Projects Editor*
B.A., Brooklyn College, 1956; M.S.J., Northwestern University, 1957. (1962-)

†Blickle, Robert L., *Professor of Entomology*
B.S., Ohio State University, 1937; M.S., University of New Hampshire, 1939; Ph.D., Ohio State University, 1942. (1938-41, 1946-)

Blood, Edward J., *Assistant Professor of Physical Education and Athletics for Men*
B.S., University of New Hampshire, 1935. (1936-)

*†Blood, Paul T., *Associate Professor of Agronomy*
B.S., New Hampshire College, 1921; M.S., University of New Hampshire, 1924. (1921-24, 1928-)

Bobick, Melvin T., *Assistant Professor of Sociology*
A.B., University of Illinois, 1949; A.M., *ibid.*, 1952; Ph.D., *ibid.*, 1958. (1958-)

Bonnice, William E., *Assistant Professor of Mathematics*
B.A.E., Syracuse University, 1951; M.S., University of Washington, 1960; Ph.D., *ibid.*, 1962. (1962-)

Borror, Arthur C., *Assistant Professor of Zoology*
B.S., Ohio State University, 1956; M.S., *ibid.*, 1958; Ph.D., Florida State University, 1961. (1961-)

Boston, Clarence E., *Associate Professor of Physical Education and Athletics for Men and Head Football Coach*
A.B., Harvard College, 1939. (1949-)

Bourne, Elizabeth A., *County Club Agent, Rockingham County*
Diploma, Framingham Normal School, 1924. (1926-)

†Bowring, James R., *Professor of Agricultural Economics*
B.S.A., University of Manitoba, 1936; M.A., University of Alberta, 1941; Ph.D., Iowa State College, 1944. (1948-)

*†Boynton, C. Hilton, *Professor of Dairy Science*
B.S., Iowa State College, 1934; M.S., *ibid.*, 1940; Ph.D., Rutgers University, 1962. (1945-)

Bradford, Robert L., *Instructor in Government*
B.A., Colgate University, 1957; M.A., Yale University, 1958. (1961-)

Bratton, Karl H., *Professor of Music*
B.M., University of Kansas, 1931; M.A., Teachers College, Columbia University, 1945. (1945-)

Breck, Robert W., *County Forester, Hillsborough County*
B.S., University of New Hampshire, 1940; M.F., Yale School of Forestry, 1941. (1947-)

Britton, John F., *Colonel, Professor of Air Science*
B.A., University of Notre Dame, 1936. (1961-)

Browne, Evelyn, *Associate Professor of Physical Education for Women*
A.B., University of California, 1943; M.A., Teachers College, Columbia University, 1943; M.A., University of New Hampshire, 1962. (1943-)

†Bruns, Paul E., *Professor of Forestry*
A.B., New York University, 1937; M.F., Yale University, 1940; Ph.D., University of Washington, 1956. (1958-)

Bryce, Forbes O., *Instructor in Sociology*
B.S., Massachusetts Maritime Academy, 1936; M.A., American University, 1961. (1962-)

Buck, Charles W., *County Club Agent, Hillsborough County*
B.S., University of Maine, 1951. (1955-)

Buksbazen, Jacqueline A., *Cataloger*
B.A., University of Arizona, 1956; M.A., University of Denver, 1957. (1962-)

Bullock, Wilbur L., *Professor of Zoology*
B.S., Queens College, 1942; M.S., University of Illinois, 1947; Ph.D., *ibid.*, 1948. (1948-)

Burton, David M., *Assistant Professor of Mathematics*
B.A., Clark University, 1954; A.M., University of Rochester, 1956; Ph.D., *ibid.*, 1961. (1959-)

Butler, Sidney R., *Assistant Professor of Physics*
B.S., University of Maine, 1954; M.S., Pennsylvania State University, 1956; Ph.D., *ibid.*, 1960. (1960-)

Butterfield, Marcius R., *County Club Agent, Cheshire County*
B.S., University of Vermont, 1958. (1962-)

Buzzi, Jorunn Lita, *Instructor in Physical Education for Women*
Snoghoj Gymnastics School, 1951-52; Sonderborg Gymnastics School, 1953; Statens Gymnastics Institute, 1955-56. (1962-)

†Byers, Gordon L., *Associate Professor of Agricultural Engineering*
B.S., McGill University, 1948; M.S.A., Ontario Agricultural College, 1950. (1956-)

Cahill, Laurence J., Jr., *Associate Professor of Physics*
B.S., Milit. Engr., United States Military Academy, 1946; B.S., Phys. Sci., University of Chicago, 1950; M.S., Physics, State University of Iowa, 1956; Ph.D., *ibid.*, 1959. (1959-)

Caldwell, S. Anthony, *Instructor in English*
A.B., Columbia College, 1952; M.A., Columbia University, 1953. (1957-)

Carroll, Harry R., *Director of Admissions*
B.A., University of New Hampshire, 1950; M.A., *ibid.*, 1951. (1951-)

CASAS, R. ALBERTO, *Professor of Foreign Languages and Literatures*
B.en L., Universidad de Barcelona, 1936; A.M., Columbia University, 1947; Ph.D., *ibid.*, 1954. (1952-)

CHAPMAN, DONALD H., *Professor of Geology*
B.A., University of Michigan, 1927; M.A., *ibid.*, 1928; Ph.D., *ibid.*, 1931. (1931-)

CHASE, JERE A., *Executive Vice President*
B.S., University of New Hampshire, 1936; M.Ed., *ibid.*, 1946. (1946-)

CHASSE, PAUL P., *Instructor in Foreign Languages and Literatures*
B.A., University of New Hampshire, 1949; M.A., Laval University, 1951. (1961-)

†CHESBRO, WILLIAM R., *Assistant Professor of Microbiology*
B.S., Illinois Institute of Technology, 1951; M.S., *ibid.*, 1955; Ph.D., *ibid.*, 1959. (1959-)

*CHRISTENSEN, ROBERT L., *Assistant Professor of Agricultural Economics*
B.S., Michigan State University, 1958; M.S., University of Delaware, 1960. (1963-)

CHUPP, EDWARD L., *Associate Professor of Physics*
A.B., University of California, 1950; Ph.D., *ibid.*, 1954. (1962-)

CLARK, DAVID G., *Associate Professor of Physics*
B.A., Park College, 1938; M.S., Texas Agricultural and Mechanical College, 1940; Ph.D., Pennsylvania State College, 1947. (1947-)

CLARK, RONALD R., *Assistant Professor of Electrical Engineering*
B.S., University of New Hampshire, 1956; M.E., Yale University, 1957. (1957-)

CLARK, SHIRLEY M., *Instructor in Government*
B.A., University of New Hampshire, 1962. (1963-)

CLARK, WILLIAM E., *Assistant Professor of Mechanical Engineering*
B.S., University of New Hampshire, 1931. (1946-)

CLARK, WINIFRED M., *Assistant Professor of The Arts*
B.S., Iowa State College, 1945; M.F.A., Cranbrook Academy of Art, 1953. (1954-)

CLIFFORD, JACQUELINE A., *Assistant Professor of Physical Education for Women*
B.S., Boston University, 1952; M.Ed., Rivier College, 1960. (1954-)

CLIFFORD, ROBERT L., *County Club Agent, Belknap County*
B.S., University of New Hampshire, 1957. (1960-)

COGAN, EUGENE J., *Major, Assistant Professor of Air Science*
(1959-)

COLBY, HALSTEAD N., *Extension Associate Professor of Agricultural Engineering*
B.S., University of New Hampshire, 1930. (1932-)

COLBY, PERLEY D., *Agricultural Agent, Hillsborough County*
B.S., University of New Hampshire, 1952. (1953-)

COLBY, STANLEY W., *Agricultural Agent, Sullivan County*
B.S., University of New Hampshire, 1934. (1940-)

COLLINS, DAVID A., *Instructor in Foreign Languages and Literatures*
B.A., University of Maine, 1952; M.A., Yale University, 1953. (1960-)

†COLLINS, WALTER M., *Associate Professor of Poultry Science*
B.S., University of Connecticut, 1940; M.S., *ibid.*, 1949; Ph.D., Iowa State University, 1960. (1951-)

†COLOVOS, NICHOLAS F., *Professor of Dairy Science*
B.S., University of New Hampshire, 1927; M.S., *ibid.*, 1931. (1928-)

COMERFORD, EDWARD V., *Agricultural Agent, Cheshire County*
B.S., University of New Hampshire, 1937. (1945-)

CONGDON, ROBERT G., *Counselor and Lecturer in Psychology*
A.B., University of California, 1947; Ed.D., Harvard University, 1961. (1952-)

†CONKLIN, JAMES G., *Professor of Entomology*
B.S., Connecticut Agricultural College, 1926; M.S., University of New Hampshire, 1929; Ph.D., Ohio State University, 1941. (1931-)

CONNER, THEODORE W., *Instructor in Physical Education for Men*
B.S., Springfield College, 1955; M.S., University of Illinois, 1958. (1962-)

COOK, CHRISTOPHER C., *Instructor in The Arts*
B.A., Wesleyan University, 1954; M.F.A., University of Illinois, 1959. (1956-57, 1959-)

†CORBETT, ALAN C., *Associate Professor of Poultry Science*
B.S., University of Maine, 1936; M.S., *ibid.*, 1937; D.V.M., Michigan State College, 1940. (1941-)

CORTEZ, EDMUND A., *Professor of Speech*
B.A., Taylor University, 1923; B.O. Asbury College, 1924; B. D., Asbury Theological Seminary, 1924; M.A., Columbia University, 1926; Ed.M., Harvard University, 1927. (1927-)

*†COWETT, EVERETT R., *Assistant Professor of Agronomy*
B.S., University of Maine, 1957; M.S., *ibid.*, 1958; Ph.D., Rutgers University, 1961. (1961-)

CROWELL, CAROLYN, *Associate County Club Agent, Grafton County*
B.S., Framingham State Teachers College, 1948. (1948-)

CRYESKY, RALPH H., *Assistant Professor of Foreign Languages and Literatures*
B.A., University of Buffalo, 1947; M.A., Harvard University, 1949; Ph.D., *ibid.*, 1953. (1951-)

CURRIER, MURIEL B., *Extension Home Economist, Grafton County*
B.S., Farmington State Teachers College, 1939. (1951-52, 1953-)

CUSHING, DANIEL, *Honorary Fellow in Metallurgy*
Ph.B., Yale University, 1912. (1952-)

CUTTER, ARTHUR H., *Agricultural Agent, Strafford County*
B.S., University of New Hampshire, 1936; M.E., *ibid.*, 1956. (1955-)

Daggett, Albert F., *Professor of Chemistry*
B.S., University of New Hampshire, 1928; M.S., *ibid.*, 1930; Ph.D., Columbia University, 1934. (1928-31, 1935-)

Daggett, G. Harris, *Associate Professor of English*
A.B., Cornell University, 1928; M.A., *ibid.*, 1929; Ph.D., University of North Carolina, 1941. (1942-)

Dale, Richard, *Instructor in Government*
A.B., Bowdoin College, 1954; M.A., Ohio State University, 1957; M.A., Princeton University, 1961; Ph.D., *ibid.*, 1962. (1962-)

Damon, John F., *County Agricultural Agent, Carroll County*
B.S., University of New Hampshire, 1961. (1961-)

Danko, Thomas, *Associate County Agricultural Agent, Merrimack County*
B.S., University of Massachusetts, 1952. (1957-)

Danoff, Alexander P., *Assistant Professor of Foreign Languages and Literatures*
A.B., New York University, 1928; A.M., *ibid.*, 1929. (1948-)

Davenport, Gilbert B., *Instructor in Speech and Drama*
B.A., Western Reserve University, 1956; Certification, Naval Intelligence School, 1958; M.A., University of Denver, 1961. (1962-)

†Davis, Henry A., *Associate Professor of Biochemistry*
B.S., University of New Hampshire, 1932; M.S., *ibid.*, 1934. (1932-)

Davis, Marion S., *Extension Home Economist Sullivan County*
B.E., Keene Normal School, 1929. (1937-)

Davis, Myra L., *Assistant Professor of Secretarial Studies*
B.S., Central Missouri State Teachers College, 1939; M.A., State University of Iowa, 1945.(1945-)

Davis, Ruth E., *Extension Associate Professor of Home Economics and Extension Home Economist, Human Relations*
B.S.Ed., Ohio University, 1935; M.A., Washington State University, 1959. (1960-)

Dawson, Charles O., *Professor of Civil Engineering*
B.C.E., Ohio State University, 1930; M.S., *ibid.*, 1940. (1930-)

Degler, Carroll M., *Professor of Business and Economics*
A.B., University of Kansas, 1925; M.B.A., New York University, 1927. (1928-)

Denison, Ellen L., *Extension Home Economist, Coos County*
B.S., Framingham Teachers College, 1923; M.P.H., Massachusetts Institute of Technology, 1930. (1955-)

Detwyler, Robert, *Instructor in Zoology*
B.S., University of the State of New York Teachers College, 1954; M.S., University of New Hampshire, 1959. (1962-)

Dewey, Richard S., *Professor of Sociology*
A.A., Pasadena Jr. College, 1934; A.B., College of Wooster, 1936; M.A., Oberlin College, 1939; Ph.D., University of Wisconsin, 1941. (1958-)

DISHMAN, ROBERT B., *Professor of Government*
A.B., University of Missouri, 1939; A.M., *ibid.*, 1940; Ph.D., Princeton University, 1948. (1951-)

DODDS, JOHN A., *Associate Professor of Dairy Science, Thompson School of Agriculture*
B.S., University of Vermont, 1936. (1953-)

DODGE, ARTHUR G., JR., *County Forester, Carroll County*
A.A., Boston University, 1950; B.S. in Forestry, University of Massachusetts, 1953; M.S.F., Harvard University, 1961. (1960-)

DOIG, GEORGE, *Instructor in Foreign Languages and Literatures*
M.A., University of St. Andrews, 1961. (1962-)

DONOVAN, EDWARD T., *Professor of Mechanical Engineering*
B.S., University of Wisconsin, 1921. (1926-)

DOWNS, RICHARD E., *Assistant Professor of Sociology*
S.B., Harvard University, 1942; Cert. of Ethn., University of Paris, 1949; Ph.D., University of Leiden, 1956. (1962-)

DRAKE, ROBERT L., *Assistant Professor of Government*
B.A., Ohio Wesleyan University, 1953; M.A., Indiana University, 1960; Ph.D., *ibid.*, 1961. (1961-)

†DREW, WILLIAM H., *Associate Professor of Agricultural Economics*
B.S., Pennsylvania State College, 1947; M.S., Rutgers University, 1949; Ph.D., Vanderbilt University, 1961. (1956-)

DUNCAN, LILLIAN R., *Loan Librarian*
B.A., University of Oklahoma, 1933. (1934-38, 1945-47, 1948-)

DUNHAM, WALLACE C., *Associate Extension Economist, Agricultural Economics*
B.S., University of Vermont, 1952; M.S., Ohio State University, 1956. (1961-)

†DUNLOP, WILLIAM R., *Professor of Poultry Science*
D.V.M., V.S., Ontario Veterinary College, 1938. (1950-)

†DUNN, GERALD M., *Professor of Agronomy*
B.S., West Virginia University, 1948; M.S., Purdue University, 1950; Ph.D., *ibid.*, 1951. (1951-)

†DUNN, STUART, *Professor of Botany*
B.S., University of Minnesota, 1923; M.S., Iowa State College, 1925; Ph.D., University of Minnesota, 1931. (1926-)

†DURGIN, OWEN B., *Registrar*
B.S., Gorham State Teachers College, 1946; M.A., University of New Hampshire, 1951. (1950, 1951-)

DURYEA, WALTER R., *Assistant Professor of Psychology*
A.B., Rutgers University, 1954; M.A., University of Connecticut, 1956; Ph.D., Florida State University, 1960. (1960-)

DYSINGER, ROBERT E., *Senior Cataloger*
A.B., Bowdoin College, 1946; M.A., University of Michigan, 1949; M.S. in L.S., University of the State of New York, 1955. (1962-)

Edwards, John C., *Director of Theater and Associate Professor of Speech and Drama*
B.S., Northwestern University, 1950; M.A., *ibid.*, 1952. (1961-)

†Eggert, Russell, *Associate Professor of Horticulture*
B.S., Michigan State College, 1929; M.S., *ibid.*, 1939. (1942-46, 1948-)

Ellis, David W., *Assistant Professor of Chemistry*
A.B., Haverford College, 1958; Ph.D., Massachusetts Institute of Technology, 1962. (1962-)

Emery, Harvard B., *Instructor in Mechanical Engineering*
Cert. in M.E., Lowell Institute, 1938. (1954-)

Faiman, Robert N., *Dean of the College of Technology, Director of the Engineering Experiment Station, and Professor of Electrical Engineering*
B.S.E.E., North Dakota State College, 1947; M.S.E.E., University of Washington, 1948; Ph.D., Purdue University, 1956. (1959-)

Fan, Stephen S. T., *Assistant Professor of Chemical Engineering*
B.S., Stanford University, 1957; M.S., *ibid.*, 1960; Ph.D., *ibid.*, 1962. (1962-)

Fasanelli, James A., *Assistant Professor of The Arts*
A.B., State University of Iowa, 1951; A.M., Harvard University, 1958. (1960-)

Fenton, Paul J., *Agricultural Agent, Merrimack County*
B.S., University of New Hampshire, 1929; M.S., Cornell University, 1941. (1952-)

Ford, Joseph P., *Instructor in Government*
B.A., University of New Hampshire, 1956; M.P.A., Harvard University, 1957. (1959-61, 1962-)

Fortuna, Diane D., *Instructor in English*
A.B., New York University, 1958; M.A., Johns Hopkins University, 1961. (1962-)

Frick, George E., *Adjunct Professor, College of Agriculture*
B.S., University of Connecticut, 1943; M.S., *ibid.*, 1947. (1957-)

Frost, Albert D., *Professor of Electrical Engineering*
B.S., Tufts College, 1944; A.M., Harvard University, 1947; Sc.D., Massachusetts Institute of Technology, 1952. (1957-)

Gaffield, Mary Barbara E., *Instructor in Home Economics*
B.A., University of Kansas, 1958; M.S., State University of Iowa, 1960. (1962-)

Gaffield, William P., Jr., *Research Associate in Chemistry*
B.S., University of Illinois, 1957. (1962-)

Galos, Andrew J., *Associate Professor of Music*
B.S., Juilliard School of Music, 1942: M.S., *ibid.*, 1952; M.A., Teachers College, Columbia University, 1956; Ed.D., *ibid.*, 1958. (1961-)

George, Ernest A., *Associate County Agricultural Agent, Hillsborough County*
B.S., University of New Hampshire, 1951. (1955-)

GILBERT, NANCY B., *Instructor in Physical Education for Women*
B.S., Pennsylvania State University, 1961. (1961-)

†GILMAN, PAUL A., *Associate Professor of Farm Mechanics, Thompson School of Agriculture, and Associate Professor of Agricultural Engineering*
B.S., University of Vermont, 1938; M.S., Pennsylvania State University, 1951. (1945-)

GILMORE, ROBERT C., *Associate Professor of History*
A.B., University of Vermont, 1944; M.A., McGill University, 1947; M.A., Yale University, 1951; Ph.D., *ibid.*, 1954. (1952-)

GOFFE, LEWIS C., *Associate Professor of English*
B.S., University of New Hampshire, 1935; M.A., *ibid.*, 1946; Ph.D., Boston University, 1961. (1946-)

GOODRICH, ROBERT E., *Assistant County Agricultural Agent, Rockingham County*
B.S., University of New Hampshire, 1958. (1958-)

GOODRICH, ROBERT W., *Assistant Professor of Electrical Engineering*
B.S.E.E., University of New Hampshire, 1957; M.S.E.E., Purdue University, 1958. (1959-)

GRAHAM, HERBERT W., *Lecturer in Zoology*
B.S., University of Pittsburgh, 1929; M.A., Stanford University, 1934; Ph.D., *ibid.*, 1938. (1957-)

GRANGER, RALPH H., *Associate Professor of Poultry Science, Thompson School of Agriculture*
B.S., Massachusetts State College, 1935; M.S., *ibid.*, 1939. (1946-)

GRANT, CLARENCE L., *Research Associate Professor, Engineering Experiment Station*

B.S., University of New Hampshire, 1951; M.S., *ibid.*, 1956; Ph.D., Rutgers University, 1960. (1952-58, 1961-)

GREENLEAF, WILLIAM, *Associate Professor of History*
B.S.S., The City College, New York, 1942; M.A., Columbia University, 1948; Ph.D., *ibid.*, 1958. (1958-)

†GRINNELL, HAROLD C., *Professor of Agricultural Economics*
B.S., Cornell University, 1921; M.S., *ibid.*, 1930; Ph.D., *ibid.*, 1941. (1932-)

GUTHRIE, AUDREY G., *Extension Associate Professor of Home Economics and Extension Home Economist, Home Management*
B.S. in Ed., Madison College, 1942; M.S., Cornell University, 1959. (1959-)

HAENDLER, HELMUT M., *Professor of Chemistry*
B.S., Northeastern University, 1935; Ph.D., University of Washington, 1940. (1945-)

HAHN, THOMAS J., *County Club Agent, Grafton County*
B.S., University of New Hampshire, 1952. (1954-)

HALL, HARRY H., *Professor of Physics*
B.S., Union College, 1926; Ph.D., Harvard University, 1934. (1940-)

HALL, JAMES W., *Assistant County Agricultural Agent, Coos County*
B.S., University of New Hampshire, 1957. (1959-)

HAM, RUTH S., *Extension Home Economist, Strafford County*
B.S., University of New Hampshire, 1924. (1955-)

HAMANN, EDMUND G., *Serials Librarian*
B.A., Hamilton College, 1955; M.A. in Library Science, University of Michigan, 1956; M.A. in History, *ibid.*, 1959. (1961-)

HAMMOND, JOHN B., *Major, Assistant Professor of Military Science*
B.S., University of New Hampshire, 1960. (1960-)

HARMON, M. JEAN, *Extension Home Economist, Merrimack County*
B.S., Nasson College, 1950. (1959-)

HARWOOD, WILFRED T. *Senior Cataloger*
B.A., University of New Hampshire, 1952; M.S., Simmons College, 1957. (1944-51, 1953-)

HASLERUD, GEORGE M., *Professor of Psychology*
B.A., University of Minnesota, 1930; Ph.D., *ibid.*, 1934. (1945-)

HATCH, JOHN W., *Associate Professor of The Arts*
Diploma, Massachusetts School of Art, 1941; B.F.A., Yale University School of the Fine Arts, 1948; M.F.A., *ibid.*, 1949. (1949-)

HAUBRICH, FREDERICK W., *Instructor in Physical Education for Men*
B.A., University of New Hampshire, 1952. (1962-)

HEILBRONNER, HANS, *Associate Professor of History*
A.B., University of Michigan, 1949; A.M., *ibid.*, 1950; Ph.D., *ibid.*, 1954. (1954-)

HENKEL, JOEL E., *Instructor in Physics*
A.B., Princeton University, 1952; M.S., University of New Hampshire, 1958; M.S., Yale University, 1961. (1961-)

†HENRY, WILLIAM F., *Professor of Agricultural Economics*
B.S., Louisana State University, 1940; M.S., University of Connecticut, 1942. (1952-)

HERBST, EDWARD J., *Professor of Biochemistry*
B.S., University of Wisconsin, 1942; M.S., *ibid.*, 1944; Ph.D., *ibid.*, 1949. (1962-)

*†HIGGINS, LEROY J., *Associate Professor of Agronomy*
B.S., University of New Hampshire, 1923. (1927-28, 1929-)

HOCHGRAF, FREDERICK G., *Assistant Professor of Mechanical Engineering*
B.Met.E., Rensselaer Polytechnic Institute, 1954; M.S. in Metallurgy, Cornell University, 1958. (1958-)

†HOCKER, HAROLD W., JR., *Associate Professor of Forestry*
B.S.F., Pennsylvania State College, 1949; M.F., North Carolina State College, 1952; D.F., Duke University, 1955. (1955-)

†HODGDON, ALBION R., *Professor of Botany*
B.S., University of New Hampshire, 1930; M.S., *ibid.*, 1932; Ph.D., Harvard University, 1936. (1930-32, 1936-)

HOFFMAN, RAYMOND A., *Assistant Professor of Music*
B.A., State University of Iowa, 1956; M.M., Louisiana State University, 1958. (1961-)

Hogan, John A., *Professor of Economics*
A.B., University of Washington, 1932; A.M., *ibid.*, 1934; M.A., Harvard University, 1948; Ph.D., *ibid.*, 1952. (1947-)

Hoitt, Samuel W., *Director of the Cooperative Extension Service*
B.S., University of New Hampshire, 1928; M.S., *ibid.*, 1931. (1929-)

Holden, John T., *Professor of Government*
A.B., Wesleyan University, 1936; M.P.A., Harvard University, 1941; M.A., *ibid.*, 1942; Ph.D., *ibid.*, 1943; LL.D. (Hon.), Nasson College, 1958. (1947-)

Holter, James B., *Assistant Professor of Dairy Science*
B.S., Pennsylvania State University, 1956; M.S., University of Maryland, 1958; Ph.D., Pennsylvania State University, 1962. (1963-)

Houston, Robert E., Jr., *Associate Professor of Physics*
B.S., Michigan State University, 1949; M.S., *ibid.*, 1951; Ph.D., Pennsylvania State University, 1957. (1957-)

Howarth, Charles H., *Director of the University Health Service*
B.S., Bates College, 1943; M.D., Tufts Medical School, 1946. (1955-)

Hraba, John B., *Associate Dean of the College of Technology and Professor of Electrical Engineering*
B.S., University of New Hampshire, 1948; M.Eng., Yale University, 1949; Ph.D., University of Illinois, 1955. (1949-)

Hudon, Edna S., *Lecturer in Foreign Languages and Literatures*
B.A., Bryn Mawr College, 1942; Ph.D., Yale University, 1955. (1961-)

Hudon, Louis J., *Professor of Foreign Languages and Literatures*
A.B., Bowdoin College, 1938; M.A., Yale University, 1942; Ph.D., *ibid.*, 1943. (1961-)

Hunter, Elizabeth A., *Assistant Professor of Education*
B.A., University of Connecticut, 1947; M.A., Teachers College, Columbia University, 1950; Ed.D., *ibid.*, 1961. (1962-)

Iddles, Harold A., *Professor of Chemistry*
B.S., Michigan State College, 1918; M.S., University of Iowa, 1921; Ph.D., Columbia University, 1925. (1929-)

Inada, Lawson F., *Instructor in English*
B.A., Fresno State College, 1959; M.A., State University of Iowa, 1962. (1962-)

Jacoby, A. Robb, *Associate Professor of Mathematics*
S.B., University of Chicago, 1941; S.M., *ibid.*, 1942; Ph.D., *ibid.*, 1946. (1961-)

James, Jesse, *State Club Leader, Cooperative Extension Service*
B.S., University of Georgia, 1937; M.S., *ibid.*, 1951. (1957-)

James, Marion E., *Assistant Professor of History*
B.A., University of New Hampshire, 1940; M.A., Radcliffe College, 1949; Ph.D., *ibid.*, 1955. (1955-)

Jellison, Charles A., Jr., *Assistant Professor of History*
A.B., Stanford University, 1944; M.A., *ibid.*, 1948; Ph.D., University of Virginia, 1956. (1956-)

JENKINS, MELVIN E., JR., *Instructor in Forestry, Thompson School of Agriculture*
B.S.F., University of Massachusetts, 1959; M.S.F., University of New Hampshire, 1961. (1961-)

JERVIS, FREDERICK M., *Director of Counseling and Lecturer in Psychology*
B.A., University of New Hampshire, 1948; M.A., ibid., 1949; Ph.D., Columbia University, 1958. (1952-)

JOHNSON, ARTHUR W., *Professor of Business and Economics*
B.B.A., College of Business Administration, Boston University, 1922; M.B.A., *ibid.*, 1929; C.P.A. (1920-)

JOHNSON, G. REID, *Associate Professor of History*
A.B., Muskingum College, 1916; M.A., Princeton University, 1920; Ph.D., University of Edinburgh, 1922. (1932-)

JOHNSON, RUSSELL W., *Instructor in Business Administration*
B.S. in B.A., Boston University, 1954; Ed.M., *ibid.*, 1960. (1960-)

JONES, PAUL R., *Associate Professor of Chemistry*
B.A., Albion College, 1952; Ph.D., University of Illinois, 1956. (1956-)

JONES, WILLIAM R., *Assistant Professor of History*
A.B., Harvard University, 1951; M.A., *ibid.*, 1952; Ph.D., *ibid.*, 1958. (1962-)

JORDAN, ROBERT W., *Professor of Philosophy*
A.B., Harvard College, 1939; M.A., Harvard University, 1947; Ph.D., *ibid.*, 1950. (1955-)

JORGENSEN, EUGENE C., *Assistant Professor of Education*
B.S., Gorham State Teachers College, 1942; M.A., University of Maine, 1949; Ed.D., Teachers College, Columbia University, 1954. (1960-)

KAUPPINEN, TENHO S., *Associate Professor of Mechanical Engineering*
B.S., University of New Hampshire, 1939; M.S., *ibid.*, 1947. (1939-)

KAY, BRIAN R., *Associate Professor of Psychology*
B.A., University of British Columbia, 1948; M.A., *ibid.*, 1949; Ph.D., University of London, 1952. (1956-)

*†KEENER, HARRY A., *Dean of the College of Agriculture, Director of the Agricultural Experiment Station, and Professor of Dairy Science*
B.S., Pennsylvania State College, 1936; M.S., West Virginia University, 1938; Ph.D., Pennsylvania State College, 1941. (1941-)

KEESEY, C. ROBERT, *Dean of Students*
B.A., Oberlin College, 1948. (1960-)

KENNEDY, KEVIN B., *Associate Agricultural Agent, Grafton County*
B.S.A., Ontario Agricultural College, 1949. (1955-)

KENNEDY, ROBERT C., *Associate Professor of Horticulture, Thompson School of Agriculture*
B.V.A., Massachusetts State College, 1940. (1941-)

KHAN, OBAIDUR R., *Research Associate in Chemistry*
B.Sc., Agra University (India), 1955; M.Sc., *ibid.*, 1957; Ph.D., University College, London, 1962. (1962-)

KICHLINE, WILLIAM L., *Professor of Mathematics*
B.A., Lehigh University, 1924; M.S., *ibid.*, 1928. (1931-)

KILPATRICK, LOUISE C., *Extension Home Economist, State Leader*
B.S., Pennsylvania State University, 1942; M.S., Cornell University, 1956. (1958-)

KILPATRICK, R. A., *Adjunct Professor, College of Agriculture*
B.S., Oklahoma Agricultural and Mechanical College, 1948; M.S., *ibid.*, 1949; Ph.D., University of Wisconsin, 1951. (1957-)

KIMBALL, HAROLD E., JR., *Riding Instructor, Department of Animal Science*
A.B., Bowdoin College, 1950. (1957-)

KIMBALL, ROBERT O., *Assistant Professor of Mathematics*
B.S., University of New Hampshire, 1941; M.A., *ibid.*, 1952. (1946-)

KIMBALL, SANDRA L., *Instructor in Home Economics*
B.S., University of New Hampshire, 1959; M.S., *ibid.*, 1961. (1961-)

KNAPP, DAVID C., *Professor of Government*
A.B., Syracuse University, 1947; A.M., University of Chicago, 1948; Ph.D., *ibid.*, 1953. (1953-)

KNOWLES, STANLEY W., *Assistant County Forester, Rockingham and Belknap-Strafford Counties*
B.S., University of New Hampshire, 1959. (1961-)

KNOX, HARRY B., *Associate County Club Agent, Rockingham County*
B.S., University of New Hampshire, 1950. (1954-)

KNUDSEN, DAVID W., *Instructor in Electrical Engineering*
B.S., University of Maine, 1951. (1962-)

KOCH, WAYNE S., *Professor of Education*
B.S., Muhlenberg College, 1941; Ed.M., Harvard University, 1945. (1945-)

KUIVILA, HENRY G., *Professor of Chemistry*
B.S., Ohio State University, 1942; M.A., *ibid.*, 1944; Ph.D., Harvard University, 1948. (1948-)

KUUSISTO, ALLAN A., *Dean of the Graduate School, Coordinator of Research, and Professor of Government*
A.B., Wittenberg College, 1942; A.M., Harvard University, 1948, Ph.D., *ibid.*, 1950. (1948-)

LAMBERT, ROBERT H., *Assistant Professor of Physics*
B.S., St. Lawrence University, 1952; M.S., Harvard University, 1954. (1961-)

LAMEYER, GORDON A., *Instructor in English*
B.A., Amherst College, 1953; M.A., Columbia University, 1959. (1962-)

LANG, KENNARD H., *Lecturer in Hotel Administration*
B.S., University of New Hampshire, 1949. (1963-)

LANGER, CLARENCE A., *Associate Professor of Horticulture*
B.S., Michigan State University, 1933; M.S., *ibid.*, 1948; Ph.D., *ibid.*, 1952. (1962-)

LANGLEY, HAROLD E., JR., *Associate Professor of Civil Engineering*
B.S., University of New Hampshire, 1949; S.M., Massachusetts Institute of Technology, 1955; M.S., University of New Hampshire, 1956; Sc.D., Massachusetts Institute of Technology, 1957. (1961-)

LAURENT, JOHN L., *Assistant Professor of The Arts*
B.F.A., Syracuse University, 1948; M.A.T., Indiana University, 1954. (1954-)

LAVINE, IRVIN, *Professor of Chemical Engineering*
B.S., University of Minnesota, 1924; Ph.D., *ibid.*, 1930. (1948-49, 1951-)

LAVOIE, MARCEL E., *Associate Professor of Zoology*
B.A., St. Anselm's College, 1940; M.A., University of New Hampshire, 1950; Ph.D., Syracuse University, 1956. (1950-52, 1955-)

†LEE, WILLIAM R., JR., *Associate Professor of Entomology*
B.S.A., University of Arkansas, 1952; M.S., University of Wisconsin, 1953; Ph.D., *ibid.*, 1956. (1956-)

LEIGHTON, CHARLES H., *Assistant Professor of Foreign Languages and Literatures*
A.B., Harvard College, 1951; M.A., Harvard University, 1953; Ph.D., *ibid.*, 1961. (1956-)

LEIGHTON, ROGER S., *County Forester, Belknap-Strafford Area*
B.S., University of New Hampshire, 1941. (1952-)

LEWIS, ALAN G., *Assistant Professor of Zoology*
B.S., University of Miami, 1956; M.S., *ibid.*, 1958; Ph.D., University of Hawaii, 1961. (1961-)

LITTLEFIELD, RALPH B., *County Agent Leader*
B.S., University of New Hampshire, 1927. (1940-)

LOCKWOOD, JOHN A., *Professor of Physics*
A.B., Dartmouth College, Thayer School of Engineering, 1941; M.S., Lafayette College, 1943; Ph.D., Yale University, 1948. (1948-)

LOHNES, PAUL R., *Associate Professor of Education*
A.B., Yale University, 1950; M.A., Harvard University, 1952; Ph.D., *ibid.*, 1960. (1958-)

LONG, DAVID F., *Professor of History*
A.B., Dartmouth College, 1939; A.M., Columbia University, 1946; Ph.D., *ibid.*, 1950. (1948-)

LOPEZ-MORALES, HUMBERTO, *Instructor in Foreign Languages and Literatures*
Licenciate of Phil. and Letters, University of Havana, 1960; Ph.D., University of Madrid, 1961. (1962-)

LOTHROP, WILLIAM W., *Counselor and Lecturer in Psychology*
B.A., University of New Hampshire, 1953; M.A., *ibid.*, 1954; Ph.D., University of Tennessee, 1959. (1960-)

LUCKEY, WILLIAM J., *Lieutenant Colonel, Assistant Professor of Air Science*
B.A., University of Alabama, 1960. (1962-)

LUNDHOLM, CARL J., *Director and Professor of Physical Education and Athletics for Men*
B.S., New Hampshire College, 1921; M.A., Columbia University, 1939. (1928-)

LUNDHOLM, DONALD A., *Major, Assistant Professor of Air Science*
B.S., U. S. Military Academy, 1946. (1960-)

LYLE, GLORIA G., *Assistant Professor of Chemistry*
B.A., Vanderbilt University, 1944; M.S., Emory University, 1946; Ph.D., University of New Hampshire, 1958. (1951-)

LYLE, ROBERT E., JR., *Professor of Chemistry*
B.A., Emory University, 1945; M.S., ibid., 1946; Ph.D., University of Wisconsin, 1949. (1951-)

MAIRHUBER, JOHN C., *Associate Professor of Mathematics*
B.S., University of Rochester, 1942; M.A., *ibid.*, 1950; Ph.D., University of Pennsylvania, 1959. (1958-)

MANTON, ROBERT W., *Professor of Music*
Harvard University, 1918. (1923-)

MARSHALL, THOMAS O., *Professor of Education*
A.B., Colgate University, 1929; Ed.M., University of Buffalo, 1933; Ed.D., Harvard University, 1941. (1947-)

MARSTON, PHILIP M., *Professor of History and University Historian*
B.A., University of New Hampshire, 1924; M.A., *ibid.*, 1927. (1924-)

MATTRAN, DONALD A., *Assistant Professor of Music*
B.M., University of Michigan, 1957; M.M., *ibid.*, 1960. (1961-)

MAYNARD, MAX S., *Associate Professor of English*
B.A., University of British Columbia, 1937. (1946-)

MCCONNELL, JOHN W., *President*
B.A., Dickinson College, 1929; Ph.D., Yale University, 1937; D.Sc. (Hon.), Dickinson College, 1959. (1963-)

MCEWEN, ROBERT B., *Instructor in Civil Engineering*
B.S., University of New Hampshire, 1956. (1962-)

MCGRATH, WILLIAM E., *Branch Librarian*
A.B., University of Massachusetts, 1952; M.A.L.S., University of Michigan, 1956. (1956-)

MCINTIRE, PAUL H., *Director of Testing and Placement*
B.A., University of New Hampshire, 1942; A.M., Boston University, 1945; Ed.D., *ibid.*, 1957. (1946-)

MCQUADE, ELIZABETH A., *Associate Dean of Students*
A.B., The State University of Iowa, 1950; A.M., University of Chicago, 1955. (1960-)

MEADER, ELWYN M., *Associate Professor of Horticulture*
B.S., University of New Hampshire, 1937; M.S., Rutgers University, 1941. (1948-)

MELVIN, DONALD W., *Assistant Professor of Electrical Engineering*
B.S., University of New Hampshire, 1955; M.E., Yale University, 1957. (1957-)

MENGE, CARLETON P., *Associate Professor of Education*
B.S., Springfield College, 1939; M.A., University of Chicago, 1940; Ph.D., *ibid.*, 1948. (1948-)

MERRITT, RICHARD D., *Assistant Professor of The Arts and University Photographer*
Rochester Institute of Technology, 1948. (1948-)

METCALF, THEODORE G., *Professor of Microbiology*
B.S., Massachusetts College of Pharmacy, 1940; Ph.D., University of Kansas, 1950. (1956-)

MEYERS, T. RALPH, *Professor of Geology*
B.A., Ohio State University, 1926; M.A., *ibid.*, 1929. (1927-)

MICHAEL, JOSEPH E., JR., *Lecturer in Business Administration*
A.B., Dartmouth College, 1948; LL.B., Boston University School of Law, 1950. (1960-)

MICHMAN, RONALD D., *Assistant Professor of Business Administration*
B.S., New York University, 1953; M.A., *ibid.*, 1957. (1960-)

MILLER, EDMUND G., *Associate Professor of English*
A.B., Dartmouth College, 1943; M.A., Columbia University, 1947; Ph.D., *ibid.*, 1955. (1951-)

MILLS, EUGENE S., *Professor of Psychology*
B.A., Earlham College, 1948; M.A., Claremont Graduate School, 1949; Ph.D., *ibid.*, 1952. (1962-)

MILNE, LORUS J., *Professor of Zoology*
B.A., University of Toronto, 1933; M.A., Harvard University, 1934; Ph.D., *ibid.*, 1936. (1948-)

MINTER, ROBERT L., *Instructor in Speech and Drama*
A.B., Miami University, 1960; M.A., *ibid.*, 1962. (1962-)

MOORADIAN, ANDREW T., *Assistant Professor of Physical Education and Athletics for Men*
B.S., University of New Hampshire, 1948. (1950-)

MOORE, ASHER, *Professor of Philosophy*
A.B., Wesleyan University, 1940; M.A., Harvard University, 1942; Ph.D., *ibid.*, 1948. (1961-)

MOORE, GEORGE M., *Professor of Zoology*
A.Sc., University of the City of Toledo, 1926; B.S., Otterbein College, 1928; M.S., University of Michigan, 1932; Ph.D., *ibid.*, 1938. (1944-)

†MOORE, HERBERT C., *Associate Professor of Dairy Science*
B.S., Purdue University, 1923; M.S., University of Minnesota, 1925. (1928-)

MOORE, ROBERT G., *1st Lieutenant, Assistant Professor of Air Science*
B.S./B.A., University of Arizona, 1957. (1962-)

MORRIS, JOHN R., II, *Instructor in Physics*
B.S., Lebanon Valley College, 1959. (1962-)

†MORROW, KENNETH S., *Professor of Dairy Science*
B.S., University of Minnesota, 1918; M.S., *ibid.*, 1925. (1934-)

Mosberg, William, *Assistant Professor of Mechanical Engineering*
B.S.M.E., Columbia University, 1956; Master of Engineering, Yale University, 1960. (1958-)

Moses, Ruth E., *Order Librarian*
A.B., Bates College, 1927; B.L.S., School of Library Science, Columbia University, 1930; A.M., Teachers College, Columbia University, 1943. (1957-)

Mower, Lyman, *Associate Professor of Physics*
B.S., University of California, 1949; Ph.D., Massachusetts Institute of Technology, 1953. (1957-)

Mulhern, John E., Jr., *Associate Professor of Physics*
B.S., Oklahoma Agricultural and Mechanical College, 1948; M.A., Boston University, 1949; Ph.D., *ibid.*, 1954. (1954-)

Munk, Rihard, *Research Associate in Chemistry*
B.S., II Realua Gimnaerja, Zabreb, 1937; M.S., *ibid.*, 1937; D.C.S., University of Zabreb, 1957. (1962-)

Munroe, M. Evans, *Professor of Mathematics*
B.A., University of Texas, 1940; Sc.M., Brown University, 1941; Ph.D., *ibid.*, 1945. (1959-)

Murdoch, Joseph B., *Associate Professor of Electrical Engineering*
B.S., Case Institute of Technology, 1950; M.S., University of New Hampshire, 1955; Ph.D., Case Institute of Technology, 1962. (1952-)

Musinsky, Christiane, *Instructor in Foreign Languages and Literatures*
B.A., University of California at Los Angeles, 1955; M.A., *ibid.*, 1958. (1961-)

Myers, Norman W., *Treasurer*
B.S., University of New Hampshire, 1950. (1953-)

Narveson, Jan F., *Assistant Professor of Philosophy*
B.A., University of Chicago, 1955 and 1956; M.A., Harvard University, 1957; Ph.D., *ibid.*, 1961. (1961-)

†Nast, Charlotte G., *Associate Professor of Botany*
B.A., University of Wisconsin, 1927; M.A., *ibid.*, 1929; Ph.D., University of California, 1938. (1943-)

Newman, Barbara K., *Associate Professor of Physical Education for Women*
B.S., Russell Sage College, 1939; M.Ed., St. Lawrence University, 1943. (1948-)

Nicholson, Arthur R. Jr., *Assistant Professor of Civil Engineering*
B.S., Tufts University, 1956. (1953-)

Nicoloff, Philip L., *Assistant Professor of English*
B.A., University of California at Los Angeles, 1949; M.A., Columbia University, 1952; Ph.D., *ibid.*, 1959. (1954-)

Nielson, Melville, *Associate Professor of Sociology and Assistant Dean, College of Liberal Arts*
B.S., Bowling Green State University, 1942; M.A., Ohio State University, 1947; Ph.D., *ibid.*, 1955. (1950-)

Nissen, Harriet J., *Extension Home Economist, Hillsborough County*
B.S., Nasson College, 1941; M.Ed., Cornell University, 1953. (1956-)

Norris, Douglas M., Jr., *Associate Professor of Mechanical Engineering*
B.S., Tufts University, 1951; Ed.M., *ibid.*, 1955; Ph.D., Michigan State University, 1962. (1962-)

Nothmann, Gerhard S., *Consulting Psychiatrist*
M.D., University of Bern, 1938. (1952-)

Nulsen, William B., *Professor of Electrical Engineering*
B.S., California Institute of Technology, 1918; M.S., University of New Hampshire, 1930. (1926-)

O'Donnell, Dorothy C., *Extension Associate Professor of Home Economics and Extension Home Economist, Related Arts*
B.S., Cornell University, 1946; M.S. in Agricultural Journalism, University of Wisconsin, 1952; M.S. in Related Art, *ibid.*, 1955. (1961-)

Off, Charles E., *Instructor in Business and Economics*
B.S., University of Illinois, 1956; M.B.A., Harvard University, 1961. (1962-)

Olson, E. William, *Associate Professor of Physical Education and Athletics for Men*
B.S., Boston University, 1940; M.S., University of Wisconsin, 1950. (1956-)

Osborn, Grace E., *Assistant Extension Home Economist, Grafton County*
B.S., Mansfield State College, 1962. (1962-)

Owens, Robert H., *Associate Professor of Mathematics*
B.S., Webb Institute of Naval Architecture, 1944; M.A., Columbia University, 1948; Ph.D., California Institute of Technology, 1952. (1956-)

Palmer, Robert S., *Adjunct Professor, College of Agriculture*
B.S.A.E., Oklahoma State University, 1953; M.Ed., University of New Hampshire, 1957. (1953-57, 1958-)

Palmer, Stuart H., *Associate Professor of Sociology*
B.A., Yale College, 1949; M.A., Yale University, 1951; Ph.D., *ibid.*, 1955. (1955-)

Partridge, Allan B., *Associate Professor of History*
A.B., Clark University, 1922; A.M., *ibid.*, 1923. (1925-)

Pearce, Ruth E., *Assistant Professor of Home Economics*
B.S., Pennsylvania State University, 1940; M.S., Cornell University, 1948. (1958-)

*†Percival, Gordon P., *Associate Professor of Biochemistry*
B.S., Massachusetts Agricultural College, 1924; M.S., *ibid.*, 1926. (1926-)

Perkins, Donald M., *Assistant Professor of Mathematics*
B.S., University of New Hampshire, 1931; M.S., *ibid.*, 1933. (1931-)

Peters, Joan A., *Extension Assistant Professor of Home Economics and Extension Editor, Home Economics*
B.Sc., Acadia University, 1953; M.S., Pennsylvania State University, 1955. (1960-)

†Peterson, Nobel K., *Associate Professor of Agronomy*
B.S., Kansas State College, 1948; M.S., Purdue University, 1950; Ph.D., Rutgers University, 1957. (1957-)

Pettibone, Marian H., *Associate Professor of Zoology*
B.S., Linfield College, 1930; M.S., University of Oregon, 1932; Ph.D., University of Washington, 1947. (1953-)

Pilar, Frank L., *Associate Professor of Chemistry*
B.S., University of Nebraska, 1951; M.S., *ibid.*, 1953; Ph.D., University of Cincinnati, 1957. (1957-)

Platt, Johnson T., *County Club Agent, Strafford County*
B.S., University of Connecticut, 1953. (1960-)

†Platts, Frances E., *Associate Professor of Home Economics*
B.S., University of New Hampshire, 1933; M.Ed., *ibid.*, 1941. (1945-)

Pollack, Jerome M., *Associate Professor of Geology*
B.S., University of Oklahoma, 1949; M.S., *ibid.*, 1951; Ph.D., *ibid.*, 1959. (1961-)

Pollack, Ruth M., *Instructor in Psychology*
B.A., University of Wisconsin, 1947; M.S., University of Oklahoma, 1952. (1962-)

Potter, Alfred R., *Instructor in The Arts*
B.F.A., Massachusetts School of Art, 1955; M.F.A., Cranbrook Academy of Art, 1960. (1960-)

Potter, Hugh M., III, *Instructor in English*
A.B., Union College, 1954; M.A., University of North Carolina, 1957. (1962-)

†Prince, Allan B., *Professor of Agronomy*
B.S., Rutgers University, 1947; Ph.D., *ibid.*, 1950. (1954-)

Pritchard, Hugh C., *Reference Librarian*
B.A., University of Washington, 1939; M.A., University of North Carolina, 1942; M.S., Columbia University, 1950. (1954-)

Prough, Elizabeth A., *County Club Agent, Coos County*
B.S., Pennsylvania State University, 1953. (1960-)

Rahman, Wasiur, *Research Associate in Chemistry*
B.Sc., D.A.V. College, Kanpur (India), 1947; M.Sc., Muslim University Aligarh, 1949; Ph.D., *ibid.*, 1957. (1962-)

Rand, M. Elizabeth, *Associate Professor of Home Economics*
A.B., Wheaton College, 1930; M.Ed., Boston University, 1946. (1943-)

Razdan, Hiralal, *Postdoctoral Research Associate in Physics*
B.A., Amer Singh College, 1953; M.Sc., Aligarh University, 1955; Ph.D., Ahmedabad University, 1961. (1961-)

Reed, Robert C., *Assistant Order Librarian*
B.A., Hartwick College, 1953; M.A.L.S., University of Michigan, 1960. (1960-)

Reske, Hermann W., *Associate Professor of Foreign Languages and Literatures*
Cand. Phil., University of Frankfurt, 1936; M.A., University of Toronto, 1957; Ph.D., *ibid.*, 1960. (1962-)

Reske, Hildegard S., *Lecturer in Foreign Languages and Literatures*
Cand. Med., University of Frankfurt, Mein, 1935; A.B., Heidelberg College, 1960. (1962-)

†Rich, Avery E., *Professor of Botany*
B.S., University of Maine, 1937; M.S., *ibid.*, 1939; Ph.D., State College of Washington, 1950. (1941-43, 1950-)

Rich, Wayne S., *County Club Agent, Merrimack County*
B.S., University of Maine, 1934. (1946-)

†Richards, Mathias C., *Associate Dean of the College of Agriculture and Professor of Botany*
B.S., Utah State Agricultural College, 1932; Ph.D., Cornell University, 1938. (1941-)

Richards, Tudor, *Forester, Cheshire and Sullivan Counties*
A.B., Harvard College, 1938; B.S.F., University of Michigan, 1952. (1954-)

Richardson, Edythe T., *Professor of Zoology*
B.S., New Hampshire College, 1922; M.S., University of New Hampshire, 1924. (1922-)

Richardson, John C., *Associate Professor of English*
A.B., Dartmouth College, 1941; M.A., Columbia University, 1942; Ph.D., Boston University, 1959. (1946-)

Richter, Maurice N., Jr., *Assistant Professor of Sociology*
B.A., Bard College, 1952; M.A., University of Chicago, 1954; Ph.D., *ibid.*, 1962. (1960-)

†Ringrose, Richard C., *Professor of Poultry Science*
B.S., Cornell University, 1932; Ph.D., *ibid.*, 1936. (1942-)

Robertson, Malcolm B., *Captain, Assistant Professor of Air Science*
B.A., Lawrence College, 1955. (1961-)

Robinson, Frederick J., *Assistant Professor of Mathematics*
B.S., University of New Hampshire, 1949; M.A., *ibid.*, 1955. (1949-)

†Rogers, Owen M., *Assistant Professor of Horticulture*
B.V.A., University of Massachusetts, 1952; M.S., Cornell University, 1954; Ph.D., Pennsylvania State University, 1959. (1959-)

Roper, Elizabeth R., *County Club Agent, Carroll County*
B.A., University of New Hampshire, 1928. (1928-)

Rosen, Sam, *Associate Professor of Economics*
A.B., University of Wisconsin, 1942; A.M., Harvard University, 1948; Ph.D., *ibid.*, 1952. (1957-)

Ross, Shepley L., *Associate Professor of Mathematics*
A.B., Boston University, 1949; A.M., *ibid.*, 1950; Ph.D., *ibid.*, 1953. (1955-)

†Routley, Douglas G., *Assistant Professor of Biochemistry*
B.S.A., University of British Columbia, 1952; M.S., Pennsylvania State University, 1953; Ph.D., *ibid.*, 1957. (1957-)

Rutherford, Richard R., *Agricultural Agent, Grafton County*
B.S., University of New Hampshire, 1940. (1940-42, 1948-)

Sackett, Everett B., *Dean of the College of Liberal Arts and Professor of Education*
B.A., Hamline University, 1923; M.A., University of Minnesota, 1925; Ph.D., Columbia University, 1931. (1938-)

Sargent, John E., *Forester, Coos County*
B.S., University of New Hampshire, 1959. (1960-)

Sargent, Leslie B., Jr., *Forester, Grafton County*
B.S., University of New Hampshire, 1943. (1954-)

Sastry, Gopala Krishna T. S., *Research Associate in Physics*
B.Sc., University of Mysore, 1945; Diploma Radio Technology, Government of Mysore, Bangalore, 1947; M.Sc., Gujarat University, Ahmedabad, 1954; Ph.D., *ibid.*, 1960. (1963-)

Savidge, Alice H., *Assistant Loan Librarian*
A.B., Bucknell University, 1940; M.A., University of Denver, 1956. (1957-)

Sawyer, Albert K., *Assistant Professor of Chemistry*
A.B., Colby College, 1940; M.S., University of Maine, 1947. (1949-)

Sawyer, Philip J., *Associate Professor of Zoology*
B.S., University of New Hampshire, 1940; M.S., *ibid.*, 1948; Ph.D., University of Michigan, 1956. (1952-)

Schaefer, Paul E., *Associate Professor of Zoology*
A.B., Bethany College, 1926; M.S., Ohio State University, 1931; Ph.D., *ibid.*, 1936. (1941-)

Schneer, Cecil J., *Associate Professor of Geology*
A.B., Harvard University, 1943; A.M., *ibid.*, 1949; Ph.D., Cornell University, 1954. (1949, 1954-)

†Schreiber, Richard W., *Assistant Professor of Botany*
B.S., University of New Hampshire, 1951; M.S., *ibid.*, 1952; Ph.D., University of Wisconsin, 1955. (1957-)

Schultz, J. Howard, *Professor of English*
B.A., University of Texas, 1933; M.A., *ibid.*, 1934; M.A., Harvard University, 1939; Ph.D., *ibid.*, 1940. (1946-)

Sherlock, Ruth L., *Instructor in Home Economics*
B.S., University of Vermont, 1957; M.S., Cornell University, 1961. (1963-)

†Shimer, Stanley R., *Professor of Biochemistry*
B.S., Muhlenberg College, 1918; M.S., Pennsylvania State College, 1923. (1924-)

Silverman, Robert J., *Professor of Mathematics*
B.S., University of Chicago, 1947; M.S., *ibid.*, 1948; Ph.D., University of Illinois, 1952. (1962-)

Skelton, Russell R., *Professor of Civil Engineering*
B.S., Purdue University, 1924; C.E., *ibid.*, 1934; S.M., Harvard University, 1939. (1928-)

†Skoglund, Winthrop C., *Professor of Poultry Science*
B.S., University of New Hampshire, 1938; M.S., Pennsylvania State College, 1940; Ph.D., Pennsylvania State University, 1958. (1950-)

†Slanetz, Lawrence W., *Professor of Microbiology*
B.S., Connecticut State College, 1929; Ph.D., Yale University, 1932. (1932-)

Sloan, Roger P., *Forester, Rockingham County*
B.S., University of New Hampshire, 1942; M.P.A., Harvard University, 1960. (1946-)

*Smith, Gerald L., *Associate Professor of Animal Science*
B.S., University of New Hampshire, 1948; M.S., Pennsylvania State College, 1951. (1948-)

†Smith, Samuel C., *Assistant Professor of Biochemistry and Poultry Science and Microbiologist*
B.S., Pennsylvania State University, 1955; M.S., *ibid.*, 1958; Ph.D., *ibid.*, 1962. (1961-)

Snell, Edward A., *County Club Agent, Sullivan County*
B.S., University of New Hampshire, 1962. (1962-)

Snively, A. Barr, Jr., *Assistant Professor of Physical Education and Athletics for Men*
B.S., Princeton University, 1923; M.A., Columbia University, 1941. (1953-)

Solt, Marvin R., *Professor of Mathematics*
B.S., Lehigh University, 1918; M.S., *ibid.*, 1925. (1926-)

Soukaris, Pauline, *Instructor in Sociology*
B.S., University of New Hampshire, 1950; M.S. in S.S., Boston University School of Social Work, 1959. (1959-)

Stabler, Joseph P., *Lieutenant Colonel, Professor of Military Science*
B.S., U. S. Military Academy, 1943; M.A., University of Virginia, 1949; Graduate, Command and General Staff College, 1958. (1960-)

Stanhope, Chester W., *Instructor in Electrical Engineering*
B.S., Worcester Polytechnic Institute, 1960; M.S., *ibid.*, 1962. (1962-)

Staugaard, Burton C., *Instructor in Zoology*
A.B., Brown University, 1950; M.S., University of Rhode Island, 1954. (1961-)

Stearns, Josephine S., *Assistant County Club Agent, Hillsborough County*
B.S., University of New Hampshire, 1958. (1960-)

Steele, Donald E., *Professor of Music*
B.M., New England Conservatory of Music, 1946; M.A., Colorado College, 1952. (1946-)

†Stevens, Clark L., *Professor of Forestry*
B.S., New Hampshire College, 1917; M.F., Yale University, 1926; Ph.D., *ibid.*, 1930. (1919-)

Stevens, Robert A., *Assistant State Club Leader, Cooperative Extension Service*
B.S., University of New Hampshire, 1937. (1955-)

Stewart, Glenn W., *Associate Professor of Geology*
B.S., University of New Hampshire, 1935; M.S., Syracuse University, 1937. (1938-39, 1941-)

Stiles, Dwight G., *Agricultural Agent, Coos County*
B.S., University of New Hampshire, 1942. (1958-)

Stimson, Ruth G., *Extension Home Economist, Rockingham County*
B.S., University of New Hampshire, 1940; M.Ed., *ibid.*, 1944. (1942-)

Stocking, Marion L., *Extension Home Economist, Carroll County*
B.S., Simmons College, 1949. (1958-)

Stolworthy, E. Howard, *Professor of Mechanical Engineering*
B.S., Tufts College, 1922. (1922-)

Stone, Deborah E., *Instructor in Education*
B.Ed., Plymouth Teachers College, 1940; Ed.M., Boston University, 1951. (1962-)

Stone, Joan T., *Assistant Professor of Physical Education for Women*
B.S., Trenton State College, 1948; M.A., Montclair State College, 1955. (1954-)

*†Strout, Richard G., *Assistant Professor of Poultry Science*
B.S., University of Maine, 1950; M.S., University of New Hampshire, 1954; Ph.D., *ibid.*, 1961. (1954-)

†Swain, Lewis C., *Professor of Forestry*
B.S., New Hampshire College, 1918; M.F., Harvard University, 1939. (1927-)

Swan, Emery F., *Associate Professor of Zoology*
B.S., Bates College, 1938; Ph.D., University of California, 1942. (1952-)

Sweet, Paul C., *Professor of Physical Education and Athletics for Men*
B.S., University of Illinois, 1923; M.A., University of Southern California, 1941. (1924-)

*Szymujko, Joseph A., *Assistant Forester, Sullivan County*
B.S., University of New Hampshire, 1954. (1957-)

Tavares, Marilyn D., *Assistant Professor of Physical Education for Women*
B.S., Sargent College, Boston University, 1953; M. A., Ohio State University, 1958. (1962-)

†Teeri, Arthur E., *Professor of Biochemistry*
B.S., University of New Hampshire, 1937; M.S., *ibid.*, 1940; Ph.D., Rutgers University, 1943. (1938-40, 1943-)

Tempone, Vincent J., *Instructor in Psychology*
B.A., Pennsylvania State University, 1955; M.A., Temple University, 1959; Ph.D., Texas University, 1962. (1962-)

Thomas, George R., *Professor of The Arts*
B.Arch., Carnegie Institute of Technology, 1930. (1930-

THOMPSON, WILBUR E., *Forester, Merrimack County*
B.S., University of New Hampshire, 1927. (1945-)

†TIRRELL, LORING V., *Professor of Animal Science*
B.S., Massachusetts Agricultural College, 1920; M.S., Massachusetts State College, 1941. (1921-25, 1930-)

TOMLINGSON, PAUL D., *Captain, Assistant Professor of Military Science*
United States Military Academy (West Point), 1953. (1962-)

TURNER, HARRY J., *Lecturer in Zoology*
B.A., Yale College, 1935; M.S., Yale University, 1942. (1956-)

TYRRELL, DORIS E., *Associate Professor of Secretarial Studies*
B.S., University of Minnesota, 1926; M.A., *ibid.*, 1932. (1938-)

UNDERWOOD, DALE S., *Professor of English*
B.A., University of Kansas, 1937; M.A., Yale University, 1947; Ph.D., *ibid.*, 1952. (1958-)

UPHAM, EDWARD F., *Agricultural Agent, Rockingham County*
B.S., University of Massachusetts, 1953; M.S., *ibid.*, 1954. (1959-)

VALENTINE, RUSSELL L., *Associate Professor of Mechanical Engineering*
Certificate in Machine Design, Wentworth Institute, 1942; B.S., Michigan State College, 1951; M.S.M.E., Purdue University, 1953. (1953-)

VALENZA, DANIEL L., *Instructor in The Arts*
A.A.S., School for American Craftsmen at Rochester Institute of Technology, 1956; B.F.A., *ibid.*, 1958. (1959-)

VERRETTE, PAUL F., *Instructor in Music*
B.A., University of New Hampshire, 1952. (1962-)

VINCENT, DONALD E., *Librarian*
B.A., University of Buffalo, 1949; A.M.L.S., University of Michigan, 1952; A.M., *ibid.*, 1957. (1962-)

WALKER, PRISCILLA S., *Assistant County Club Agent, Strafford County*
B.S., Nasson College, 1961. (1961-)

†WALLACE, OLIVER P., *Associate Professor of Forestry*
B.S., University of New Hampshire, 1937; B.S.F., University of Michigan, 1938; M.F., *ibid.*, 1947; Ph.D., *ibid.*, 1954. (1953-)

WALLACE, WILLIAM H., *Associate Professor of Geography*
B.S., Beloit College, 1948; M.S., University of Wisconsin, 1950; Ph.D., *ibid.*, 1956. (1957-)

WANG, TUNG-MING, *Assistant Professor of Civil Engineering*
B.S.C.E., National Chiao-Tung University, 1945; M.S.C.E., University of Missouri, 1954; Ph.D., Northwestern University, 1960. (1961-)

WARREN, RICHARD, *Professor of Poultry Science*
B.S., Cornell University, 1934; M.S., *ibid.*, 1935. (1937-)

WEBBER, LAURANCE E., *Research Professor and Associate Director, Engineering Experiment Station*
B.S., University of New Hampshire, 1934; M.E., *ibid.*, 1940; M.S., *ibid.*, 1946. (1937-)

Webster, Robert G., *Professor of English*
B.A., University of New Hampshire, 1926; M.A., *ibid.*, 1930. (1927-)

Weeks, Silas B., *Associate Professor of Agricultural Economics*
B.S., Cornell University, 1937. (1954-)

Weston, Ruth C., *Associate State Club Leader, Cooperative Extension Service*
B.A., New Hampshire College, 1921; M.Ed., University of Maryland, 1953. (1929-)

Wheeler, Charles M., Jr., *Associate Professor of Chemistry*
B.S., West Virginia University, 1947; M.S., *ibid.*, 1949; Ph.D., *ibid.*, 1951. (1950-)

Whitlock, John B., *Associate Professor of Music*
B.Ed., Southern Illinois Normal University, 1937; M. A., State University of Iowa, 1941; Ph.D., *ibid.*, 1958. (1958-)

Wicks, John D., *Assistant Professor of Music*
A.B., Harvard University, 1944; A.M., *ibid.*, 1947; Ph.D., *ibid.*, 1959. (1956-)

Williams, Thomas A., Jr., *Assistant Professor of English*
B.A., University of New Hampshire, 1950; M.A., *ibid.*, 1958. (1958-)

Williamson, Phyllis D., *Instructor in Speech*
B.A., Louisiana State University, 1945; M.A., *ibid.*, 1953. (1957-)

Wills, Dorothy S., *Assistant Professor of Home Economics*
B.Sc., Drexel Institute of Technology, 1953; M.Sc., *ibid.*, 1955. (1958-)

Wilson, John A., *Instructor in Mechanical Engineering*
B.S. in M.E., Tufts University, 1958; M.S. in M.E., Northeastern University, 1960. (1960-)

Wingersky, Bary G., *Research Associate in Mathematics*
A.B., Tufts University, 1942. (1960-)

Winn, Alden L., *Professor of Electrical Engineering*
B.S., University of New Hampshire, 1937; S.M., Massachusetts Institute of Technology, 1948. (1948-)

Witt, Warren W., *Lieutenant Colonel, Assistant Professor of Military Science*
B.S., Oklahoma Agricultural and Mechanical College, 1947. (1959-)

Woodruff, Ruth J., *Professor of Economics*
A.B., Bryn Mawr, 1919; A.M., *ibid.*, 1920; Ph.D., Radcliffe College, 1931. (1931-)

Wooster, Caroline S., *Associate Professor of Physical Education for Women*
Sargent School for Physical Education, 1926; B.S., University of New Hampshire, 1934. (1944-)

†Wright, Paul A., *Professor of Zoology*
S.B., Bates College, 1941; A.M., Harvard University, 1942; Ph.D., *ibid.*, 1944. (1958-)

Wu, Mu Tsu, *Research Associate in Chemistry*
B.Sc., National Taiwan University, 1951; D.Sc., Tohoku University, 1961. (1962-)

Wybourn, Marjory A., *Professor of Home Economics*
B.S., University of Washington, 1944; M.A., Teachers College, Columbia University, 1948; Ed.D., *ibid.*, 1958. (1962-)

Yarrington, Eugene N., Jr., *Assistant Professor of English*
B.A., Boston University, 1949; M.A., *ibid.*, 1951; Ph.D., University of Illinois, 1962. (1962-)

Yount, John A., *Instructor in English*
B.A., Vanderbilt University, 1960; M.F.A., State University of Iowa, 1962. (1962-)

Zei, John J., Jr., *Assistant Professor of Music*
B.M., Lawrence Conservatory, 1953; M.M., University of Michigan, 1959. (1959-)

Zervas, Nicholas P., *Honorary Fellow in Poultry Science*
B.Sc., Agricultural College of Athens, 1950; M.Sc., Cornell University, 1954; Ph.D., Agricultural College of Athens, 1959. (1960-)

Zevos, Nicholas, *Instructor in Chemistry*
B.A., St. Anselm's College, 1954. (1962-)

Zimmerman, Oswald T., *Professor of Chemical Engineering*
B.S.E., University of Michigan, 1929; M.S.E., *ibid.*, 1931; Ph.D., *ibid.*, 1934. (1938-)

Zoller, J. Harold, *Professor of Civil Engineering*
B.S.C.E., University of Wyoming, 1941; B.S.E.E., University of Illinois, 1945; Ph.D., University of Wisconsin, 1953. (1958-)

Zuckerman, Harvey S., *Instructor in English*
B.A., City College of New York, 1957; M.A., Columbia University, 1959. (1962-)

Zweizig, Douglas L., *Instructor in English*
B.A., Lafayette College, 1960; M.A., Harvard University, 1961. (1961-)

Methods of Admission

University admissions policy is designed to provide for the admission of those students whose personal record, achievement, aptitude, and motivation demonstrate that they have the qualifications for carrying the desired program satisfactorily.

The University admits in-state residents who have a scholastic record which ranks them in the upper two fifths of their graduating classes from accredited or approved secondary schools, provided they are recommended or certified, and have an appropriate college preparatory background. All candidates for admission to the University are required to submit the results of the College Entrance Examination Board Scholastic Aptitude Tests and the Writing Sample taken during the senior year. In addition, applicants are urged to submit a minimum of two College Board Achievement Tests, one in English and the other in an area directly related to a student's probable major, i.e., advanced mathematics for engineering and technology, language for Liberal Arts, etc.

The number of out-of-state students admitted each year is limited and selection is made primarily on the basis of superior academic achievement in secondary school. Such traits as character, leadership, and initiative are taken into account.

All applicants living in New Hampshire are required to submit a notarized statement to the effect that their parents are legally domiciled in the state. Students admitted from states other than New Hampshire or from foreign countries are considered as non-residents throughout their entire attendance at the University unless their parents have gained bona fide residence in New Hampshire.

Except for early decision candidates, application should be submitted only after the first term grades are available and for non-resident applicants, before February 15.

No New Hampshire applicant can be considered whose application is not complete at least a month before the beginning of the academic year. A non-refundable application fee — $5.00 for residents of New Hampshire and $15.00 for non-residents — must accompany the application.

The University recommends the following secondary academic program for students applying to the several undergraduate colleges:

	Agriculture	*Liberal Arts*	*Technology*	*WSBE*
English	4 units	4 units	4 units	4 units
Language	2 units	3 units (of a single foreign language)	3 units	3 units
Mathematics	3 units (including algebra, plane geometry, and trigonometry)	3 units	4 units (including algebra, plane geometry and trigonometry)	3 units
Laboratory Science (excluding general science)	3 units	3 units	3 units	3 units
Social Studies	3 units	3 units	2 units	3 units

The University will consider applicants who have taken less than the recommended programs with the following minimums: Agriculture — English 4, languages 0, mathematics 2, science 1, and social studies 2; Liberal Arts — English 4, language 2, mathematics 2, science 1, and social studies 2; Technology — English 4, mathematics 3½, science 2 (physics and chemistry), language 0, and social studies 2; Whittemore School minimums are similar to those of Liberal Arts. In any event, the number of academic units must total 12 and include the subject matter minimums specified.

Interviews are *not* required as part of the admission process. They may, however, be requested by the Admissions Office if deemed necessary or desirable to make an equitable decision. The University will give prospective applicants an indication of admission based upon scholastic attainment of three years under an early decision procedure. The plan is specifically appropriate for well qualified students who have made the University their first choice and who submit a regular application including junior SAT's with a signed statement that the University is the number one choice and that applications to other colleges will be withdrawn if he is admitted under the early decision procedure.

The University participates in the Regional Cooperation Program of the New England Board of Higher Education in which students from other New England states are given priority in certain curricula, as well as special tuition consideration. Information may be obtained from the New England Board of Higher Education, 31 Church Street, Winchester, Massachusetts, or from the admissions offices of the New England state universities.

University Academic Requirements

In addition to the particular requirements for specific degrees established by the colleges, the University requires that every candidate for a bachelor's degree must successfully complete English 1-2; History 1, 2; and one year of work (6 semester hours) in each of the following groups:

Group B (Natural Sciences)
Biology 1-2, 3; Botany 1; Chemistry 1-2, 3-4; Geology 1-2; Mathematics 7-8; Physical Science 1-2; Physics 1-2.

Group C (Social Sciences)
Economics 1-2; Geography 1, 2; Government 5, 6, 8; Psychology 1, 37, 44, 47; Sociology 1, 2, 33.

Group D (Humanities)
Arts 31, 32; English 13, 14, 15, 16; Humanities 1-2; Music 37, 38; Foreign Languages 3-4 level courses; Philosophy 5, 8, 21, 22; Speech and Drama 21, 24.

University Fees and Expenses

The cost for the freshman year at the University averages about $1,250 for a resident of New Hampshire and $1,700 for a non-resident.

Tuition is $380 ($800 for non-residents).* Any student registering for eight credits or more per semester pays the full tuition. Any student registering for fewer than eight credits pays $17.50 per credit hour.

Tuition for each semester is payable in advance. Three-fourths will be refunded to a student withdrawing during the first four days of a semester; one-half after four days and within thirty; and none thereafter.

Refundable deposits may be required to cover locker keys or loss or breakage in certain departments. A charge will be made for individual lessons in music, as noted in the description of Applied Music courses. A charge will be made for riding lessons, as noted in the sections on Physical Education for Women and Animal Science.

Board is $360.00. Upon completion of the new Ballard Drive Dining Hall, all freshmen, sophomores, and juniors resident in University housing units (not including fraternities nor sororities) are required to board in University dining halls. The purpose of this regulation is to insure that the health of students is safeguarded by offering skilled dietetic supervision in the selection and preparation of well-balanced meals. There are cafeterias in University dining halls and at the Memorial Union for seniors and graduate students.

Books cost between $75 and $100. These and classroom supplies may be purchased at the University Bookstore.

There is a Memorial Union assessment of $12 and an activity tax of $10 which includes a subscription to the undergraduate newspaper and yearbook, and membership in Student Union, Student Government, and class activities.

---

* As part of the regional cooperation program of the New England Board of Higher Education, many non-residents from certain states will be eligible for tuition at the in-state rate in selected curricula. The student must apply to the Registrar for this reduced tuition.

Personal expenses average $200. These will vary with the needs of the individual student, and include clothing, laundry, recreation, incidentals, and travel.

The University reserves the right to adjust charges for such items as tuition, board, and room rent from time to time. Such changes will be held to a minimum and will be announced as far in advance as feasible.

A deposit of $15 is required of each student to whom military equipment is issued. Every student participating in the program of Physical Education and Athletics for Men and Physical Education for Women is required to pay $1 for locker and towel service.

University Housing

Room rents average $230. The University has ten residence halls for women and seven for men. Undergraduate women are required to live in a residence hall or sorority house unless they live at home. Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of the space available. Room rents range from $165 to $290.

Students living in University residence halls are required to sign room contracts covering the entire year beginning in September and ending in June. Housing applications will be sent to the student at the time of official admittance to the University. A ten dollar ($10.00) room deposit must accompany each application for a room. This deposit will be forfeited if the applicant fails to pay room rent by a stipulated date or cancels after that date. Upon occupancy the deposit is held as a damage deposit.

Room rent is payable in advance. For those attending the first semester, one-half of the year's rent must be paid not later than August 15. Rent for those attending the second semester must be paid not later than January 15.

Assignments to University residence halls are made during July and August. A notice of room assignment and bill will be sent when assignment is complete. In the event of a late assignment, the deadline payment date for room rent will be extended as indicated on the notice of room assignment and bill. Failure to pay rent within the specified time will automatically cancel room reservation. No follow-up notice will be sent.

A separate check payable to the University of New Hampshire should be forwarded to the Housing Office for room rent.

Rooms paid for and not occupied one day after registration day may be declared vacant and three-fourths of the room rent returned, unless the individual having the reservation makes a written request to the Manager of University Housing to hold the room until a later date. No room will be held for longer than 10 days after registration date.

An undergraduate woman student under 23 years of age is required to room in one of the women's residence halls or a sorority house, unless she is working for a room in a private home or living with her family.

Financial Aid

A financial aids program assists able and promising students who are unable to meet their educational expenses entirely from their own or their family's resources.

Tuition Grants and Scholarships

A resident of New Hampshire is eligible for consideration for a tuition grant. The amount varies from $100 to full tuition, and the basic consideration is financial need. There are scholarships available for both resident and non-resident students. The basis of these awards may be either scholastic attainment, meeting particular requirements as outlined by the donor,

participation in extra-curricular activities, or other. No awards are made until a student has been admitted to the University, has submitted an application for a grant or scholarship, and his parents have filed a parents' confidential statement with the College Scholarship Service at Princeton, New Jersey.

In-state students may secure applications for grants or scholarships as well as the parents' confidential statement from high school principals or guidance counselors. Out-of-state and transfer students may secure applications for grants or scholarships from the Financial Aids Office, UNH, and the parents' confidential statement from high school principals or guidance counselors. Applications are due May 1.

Loans

There are two loan funds administered by the University: the UNH Loan Fund and the National Defense Student Loan Fund. Financial need must be clearly demonstrated and loans may be used for expenses incurred in pursuing a college education. Applications for loans may be secured from the Financial Aids Office, UNH. Applications are due July 1.

Employment

Various types of employment are usually available to students wishing to work part time. However, freshmen and transfer students are not encouraged to work during their first semester.

For additional information, contact the Financial Aids Office.

College of Agriculture

Harry A. Keener, *Dean*
M. C. Richards, *Associate Dean*

Departments

Agricultural Economics
Agricultural Education
Agricultural Engineering
Agronomy
Animal Science
Biochemistry
Botany
Dairy Science
Entomology
Forestry
Home Economics
Horticulture
Poultry Science

GENERAL INFORMATION

The objectives of the College of Agriculture are to give the student a fundamental education in the biological, physical, and social sciences and to provide specific technical training according to student interest in agriculture, agricultural engineering, forestry, or home economics.

Agriculture includes the production of food and fiber, and in addition, the processing, distributing, and marketing of agricultural products. These operations provide a wide range of career opportunities for adequately prepared college graduates. Government agencies offer career opportunities for graduates of agricultural colleges.

Many graduates study for advanced degrees in order to prepare for the specialized positions available in teaching, research, extension, and industry. The program of study for a student who plans to enter graduate school should differ from that of a student who intends to accept a position immediately after completing the bachelor's degree. The college will help the student with his choice of a career and prepare him for competence and leadership in that career.

The College of Agriculture offers the following degrees: Bachelor of Science, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, and Bachelor of Science in Home Economics.

Upon entering the College of Agriculture a student will declare what degree he or she seeks. In each of these degree programs the following curricula are available:

1. Bachelor of Science
   - Agricultural Business and Marketing
   - Agricultural Science
   - Agricultural Technology

2. Bachelor of Science in Agricultural Engineering
   - Agricultural Enginering

3. Bachelor of Science in Forestry
   - Forestry
   - Forest Game Management

4. Bachelor of Science in Home Economics
   - General Home Economics
   - Clothing and Textiles
   - Foods, Nutrition, and Institutional Administration
   - Home Economics Education

The student may select his curriculum and area of specialization upon entering as a freshman or he may wait until registration for the sophomore year. If he does not make his decision upon entering the University, the Associate Dean of the College of Agriculture will act as his adviser during the freshman year. Upon choosing a curriculum the student will be assigned an adviser, a faculty member from the department most directly concerned. Should the student elect to change his curriculum or area of specialization a new adviser may be assigned.

For the degree of Bachelor of Science, Forestry, or Home Economics, each candidate must complete 136 semester credits; for the degree of Bachelor of Science in Agricultural Engineering, each candidate must complete 144 semester credits.

BACHELOR OF SCIENCE

The following curricula are available for students seeking a Bachelor of Science degree:

Agricultural Business and Marketing

The Agricultural Business and Marketing curriculum provides for those interested in the business management and economic aspect of the agricultural industry. The general program is designed to provide basic training in specific areas of interest supplemented by training in business management and the economic aspects of agriculture. Recent trends toward larger agricultural organizations have created a demand for agricultural graduates trained in business and marketing.

Opportunities for employment in a variety of professions are available, including the business management of processing plants, sales agencies, in agricultural cooperatives, analysis and forecasting of prices for agricultural commodities, or employment in federal and state agencies.

Because of the wide range of opportunities, study programs for individual students will vary considerably. The student will be advised in both the area of his interest and the business and economic aspect of his program.

Agricultural Science

The Agricultural Science curriculum is intended for the student interested in obtaining a strong background in the biological, physical, or social sciences. Such a background is highly desirable for the research scientist who is assuming an increasingly vital role in world agriculture. It is equally desirable for the teacher who is able to translate research information into terms intelligible to the production specialist.

Career opportunities for agricultural scientists are many and varied. State and federal agencies, universities, and industries increasingly are sponsoring both basic and applied research. Educational institutions have a growing need for teachers trained in science.

Careers in research and teaching generally require graduate degrees. The agricultural science curriculum permits an area of specialization and insures the wide background in the basic sciences which is indispensable for graduate study.

Agricultural Technology

The Agricultural Technology curriculum is designed for the student desiring a comprehensive modern training in the production aspects of his particular area of specialization or a combination of related areas. Since

the production phase of agriculture today involves large-scale organizations, some even with foreign operations, preparation for work in this area requires broad, general training with specialization in one or two areas.

This curriculum provides a good background in the biological and physical sciences and also in the humanities and social sciences. It is sufficiently flexible to permit choice of courses in agricultural credit and business, education, and foreign languages.

Many excellent opportunities are available in a variety of industries for students prepared under the agricultural technology curriculum. Included are such positions as farm managers, county 4-H and agricultural extension agents, production specialists, and vocational agricultural instructors. Positions are also available in management, research, selling, and service work in commercial organizations, and with state and federal agencies in grading, inspection, and regulatory work.

GENERAL REQUIREMENTS

The student will elect one of the following three curricula: Agricultural Business and Marketing, Agricultural Science, or Agricultural Technology. He will also choose an area of specialization from the following:

Agricultural Economics
Agricultural Education
Agronomy
Animal Science
Biochemistry
Botany
Dairy Science
Entomology
Horticulture
Mechanized Agriculture
Poultry Science
Pre-Veterinary Medicine

In order to qualify for a degree each candidate must accumulate 136 semester credits, including credits for courses prescribed by his adviser. He must also achieve a grade point average of at least 2.

A recommendation is required for graduation from the adviser for each student.

SPECIFIC REQUIREMENTS

During the freshman year nearly all students who are candidates for the degree of Bachelor of Science will pursue the same general outline of course work as listed below:

	First Semester Credits	*Second Semester Credits*
R.O.T.C. — *Reserve Officers Training Corps*	0 or 2	0 or 3
P.E. — M or W — *Physical Education*	½ or 1	½ or 1
Agr. 1 — *Introduction to College*	1	
Bot. 1 — *General Botany*	4	
Chem. 1, 2 or 3, 4 — *General Chemistry*	4	4
Elective courses	3–5	5–6
English 1, 2 — *Freshman English*	3	3
Zool. 48 — *Principles of Zoology*		3
	17	17

Students must complete the following course work: Sophomore R.O.T.C., (3 or 4 credits), Economics 1 (3 credits), Physics (4 credits), English and/or Speech (5 credits), Mathematics (6 credits.*

* Students presenting at least 3 entrance units of college preparatory mathematics, including algebra, geometry, and trigonometry, will be required to take the University mathematic placement test and then satisfy the curriculum mathematics requirements. Students not satisfying the 3 entrance units are required to complete 6 credits of mathematics.

UNIVERSITY REQUIREMENTS

Students admitted to the University for the first time, beginning with 1963-64 academic year, are required to complete six semester hours in each of the following groups. Completion of thirty or more hours in three or more areas in any one group satisfies the requirements of that group and advanced placement at time of admission also satisfies the requirement of that group.

Group A — History 1 and 2.

Group B — Biology 1-2 and 3. Botany 1, Chemistry 1-2, Chemistry 3-4, Geology 1-2, Mathematics 7-8, Physical Science 1-2, Physics 1-2.

Group C — Economics 1-2, Geography 1, 2, Government 5, 6, and 8, Psychology 1, 37, 44, and 47, Sociology 1, 2, and 33.

Group D — Arts 31, 32, English 13, 14, English 15, 16, Humanities 1-2, Music 37-38, Foreign Languages at 3-4 level, Philosophy (5), (8), 21, 22, Speech and Drama 21 and 24.

Some of the courses in the above groups are the same as those required by the College and will therefore fulfill both a College and a University requirement.

ADDITIONAL REQUIREMENTS

In order to complete the requirements for the Bachelor of Science degree in Agriculture, a student must obtain, in addition to the specific requirements, credits in the following groups:

Group A — Arts, English, Humanities, Language, Music, Philosophy, Speech

Group B — Botany, Entomology, Microbiology, Zoology

Group C — Biochemistry, Chemistry, Mathematics, Physics, Statistics

Group D — Economics or Agricultural Economics, Education, Government, History, Psychology, Sociology

Group E — Courses in the College of Agriculture

Group F — Courses which adviser considers necessary for specialized study in area of specialization

Group G — Elective courses which the student considers appropriate to meet his educational objectives

The group requirements for each curriculum are as follows:

Agricultural Business and Marketing

Group A — 6 credits
Group C — 3 credits
Group D — 9 credits selected from at least 3 of the subject areas listed; Also 9 credits in Economics 2 and Business Administration 1, 2
Group E — 9 credits selected from at least 3 subject areas other than his area of specialization
Group F — 30 credits
Group G — 23 credits*
47 credits specific requirements

136 credits

Agricultural Science

Group A — 9 credits
Group B — 6 credits
Group C — 9 credits selected from at least 2 of the subject areas listed
Group D — 9 credits selected from at least 2 of the subject areas listed
Group E — 3 credits in a subject area other than his area of specialization
Group F — 30 credits
Group G — 23 credits*
47 credits specific requirements

136 credits

Agricultural Technology

Group A — 6 credits
Group B — 3 credits
Group C — 6 credits selected from at least 2 of the subjects listed
Group D — 9 credits selected from at least 3 of the subjects listed
Group E — 12 credits selected from at least 3 subject areas other than his area of specialization
Group F — 30 credits
Group G — 23 credits*
47 credits specific requirements

136 credits

The above curricula offer a student considerable flexibility depending upon his interest and objectives.

* Depending upon the specific courses chosen by the student in groups A through E, there may remain somewhat fewer than 23 credits in Group G.

AREAS OF SPECIALIZATION

Agricultural Economics	Dairy Science
Agricultural Education	Entomology
Agronomy	Horticulture
Animal Science	Mechanized Agriculture
Biochemistry	Poultry Science
Botany	Pre-Veterinary

Agricultural Economics

The student in Agricultural Economics learns primarily the science of economics and the application of economics to farm management, food marketing, agricultural price policy, use and conservation of natural resources, world food supply, and growth in underdeveloped countries. In addition, students majoring in this field will obtain a sound background in scientific farming from courses in agricultural production. The student is also encouraged to take courses contributing to a broad university education.

Course work in Agricultural Economics can be arranged under either of the three curricula for the degree of Bachelor of Science in Agriculture:

1. *Agricultural Business and Marketing:* The agricultural producer is being served by an expanding group of marketing and service firms requiring agricultural college graduates with economics and business training. In Agricultural Economics the program emphasizes marketing and market development, agricultural business management,, consumer economics, price analysis, and farmer cooperation, with supplementary courses in accounting.

2. *Agricultural Science:* This curriculum is designed for students interested in college teaching, scientific research, and careers in specialized fields requiring strong backgrounds in the economics of agriculture. Some of the specialized fields are foreign service in underdeveloped countries, market development and price analysis, agricultural banking, and resource conservation. Emphasis is placed upon the basic concepts and theories of economics and their application to agriculture and marketing. This curriculum also will be advantageous for the student planning to pursue graduate study.

3. *Agricultural Technology:* Students in this curriculum who choose Agricultural Economics as their special area of interest will be preparing for careers associated with the broad economics aspects of agricultural production and marketing. This program of study will prepare the student as a farm owner or manager. In addition he will be qualified to fill numerous available positions with such organizations as the agricultural extension service, banks, farmers' cooperatives, market regulating organizations, and firms selling farm supplies or farm products. The student will take specific courses in production economics, marketing, agricultural policy, farm credit, and agricultural cooperatives.

The courses in Agricultural Economics are complementary with those offered by other departments in the College and are in part designed to help major students in other fields gain knowledge about economics related to agriculture.

Agricultural Education

The Agricultural Education curriculum provides for a basic and liberal preparation for students who plan to teach agriculture or seek employment with the Cooperative Extension Service as county agricultural agents or 4-H club agents. Graduates will also find employment in other specialized positions with industry or in education where a broad background of technical and professional skills are needed for sales, promotional, administrative, or research activities.

Students in this curriculum will satisfy state teacher certification requirements or the Extension Service preparation recommendations by one semester off-campus experience in a student training center or a County Cooperative Extension Service office.

Students desiring to major in Agricultural Education should consult the professor in charge before the end of the sophomore year.

Students in other areas of specialization who may wish to minor in Agricultural Education should consult their advisers and the professor in charge of Agricultural Education early in their academic careers.

Agronomy

Students specializing in Agronomy obtain a basic knowledge of the physical and biological sciences in addition to learning the fundamental principles in soils, field crops, plant breeding, and plant genetics. Basic training in the soil and crop sciences is essential to most segments of agriculture.

Those students who specialize in soils may find employment in soil conservation, soil classification and mapping, soil fertility, soil physics, soil chemistry, soil microbiology, and many other fields requiring a knowledge of the soil. Those who specialize in crops will be qualified for employment in crop production, plant breeding, turf management, weed control, crop introduction, and in related fields.

Persons trained in Agronomy are qualified to take Federal Civil Service examinations to enter field crops, soil science, or soil conservation positions in the United States Department of Agriculture. Positions in research and teaching are also available to those with advanced training at the graduate level. The agricultural extension services, as well as seed, feed, and fertilizer companies, employ graduates who have training in Agronomy.

Well-equipped laboratories and greenhouse facilities are provided for students. Opportunities are available to study nearby field experiments.

Animal Science

Animal Science is offered to students who wish training in the selection breeding, feeding, fitting, showing, training, and management of light horses, beef cattle, sheep, and swine. It provides basic knowledge for all livestock enterprises and related fields, including conservation and the packing and feed industries.

Many graduates enter the field of extension work as county agents and livestock specialists. The subject matter is fundamental for advanced study in Animal Science. Some who have completed this curriculum are executives, managers, veterinarians, college teachers, breed representatives, packer buyers, feed salesmen, and farm operators.

Students are assigned advisers in the Animal Science Department. The adviser will discuss the areas of the individual's special interest and recommend a choice of Agricultural Science, Agricultural Business and Marketing, or Agricultural Technology as a guide in course selection.

Meat and meat products are included in this curriculum. Cultural subjects are required. Students interested in certain classes of livestock may have opportunities to specialize.

The department maintains Morgan horses for all phases of class work including riding. Selected students may be permitted to take young horses to their homes in the summer for continued training. Herds of Milking Shorthorn, Hereford, and Angus cattle, Yorkshire swine, and a flock of Dorset sheep are maintained.

Biochemistry

Students choosing Biochemistry as their area of specialization will elect the Agricultural Science curriculum. They will receive training in the various branches of general chemistry and in the application of chemistry to the growth and development of plants and animals. The methods used in biochemical analysis and in the study of nutrition and metabolism are given special attention.

The curriculum is designed to provide a thorough foundation for students preparing for graduate study and eventual teaching or research, or for technical positions in universities, experiment stations, research institutes, and industrial organizations related to the life sciences. A student who wishes to major in this department should take Chemistry 3-4, and Mathematics, in his freshman year.

As this is a professional and specialized field, entrance to it, and continuance in it, are conditioned by a satisfactory record. An early conference with the chairman of the department is imperative.

Botany

Students interested in a broad background in the plant sciences should consider majoring in Botany. Such students will generally choose the Agricultural Science curriculum.

The principal areas of concentration in Botany are: (1) Plant Pathology — the study of plant diseases, their causes and control; (2) Physiology — the study of plant functioning with such practical applications as plant nutrition and requirements for plant growth; (3) Taxonomy — plant classification and plant identification; (4) Ecology — the relationship of the plant to its environment; (5) Morphology and Anatomy — The study of the anatomy, development, and cellular organization of plants, including histological techniques; (6) Cytology — the cell, cytological techniques, and chromosome studies; (7) Preparation for botanical technicians; and (8) Preparation for secondary-school teaching.

The undergraduate courses to be taken in all these fields are nearly the same until the junior and senior years. Some specialization should then be made. The student who graduates in Botany may take graduate work in Botany or in the related fields of Horticulture, Forestry, and Agronomy which require an extensive background in Botany. Assistantships, research positions, and full-time teaching jobs are more available at present than in previous years. Opportunities for able botanists also occur in government work. Positions as technicians or secondary-school teachers may be obtained with a B.A. or B.S. degree.

Dairy Science

Dairy Science courses are designed to provide fundamental scientific training in dairy production and dairy technology.

Outstanding graduates from both of these areas are qualified to pursue advanced study in preparation for college teaching, research, and specialized

technical positions in industry, agricultural experiment stations, and federal and state agencies.

Dairy production courses include breeding, nutrition, and management of dairy cattle. They offer preparation for the various agricultural industries and services related to dairy farm operations, such as technical positions in the food industry, the dairy equipment industry, and breed and breeding organizations; positions in public service with state and federal agencies; and dairy farm management.

Training in dairy technology prepares students for administrative and plant and laboratory positions in dairy processing plants, and for inspectors of dairy products and dairy establishments in federal, state, and municipal service.

The University dairy herd, together with the operations in the market milk, pasteurizing, and ice cream units at the Dairy Building, contribute to the practical training of students in any one of several lines of the dairy industry.

The Dairy Science laboratories are located in the Dairy Building, in the Ritzman Animal Nutrition Laboratory, and in the Dairy Barn. Facilities in the area of dairy production include the University dairy herd, consisting of purebred Ayrshire, Guernsey, Holstein, and Jersey animals. This herd has received national recognition and honors.

Equipment in the Ritzman Animal Nutrition Laboratory includes bomb calorimeters, metabolism stalls for digestion studies, respiration chambers for heat production measurements, and other facilities used in nutrition research with both farm and laboratory animals. Facilities for dairy technology, located in the Dairy Building, include pasteurizers, coolers, ice cream freezer, bottler, refrigeration units, homogenizer, and a soaker type bottle washer. The milk testing and bacteriological laboratories are equipped for chemical and bacteriological analyses of dairy products.

Entomology

Entomology offers courses for students who wish to specialize in the study of insect life, insect control, apiculture, and insects in relation to man. There are many fields open to those qualifield in Entomology. There are opportunities for employment in public institutions and organizations, and in addition, there are many opportunities for employment with commercial and industrial firms.

Students who desire a broad fundamental training in Entomology and related fields will follow the program outlined as General Entomology in the Agricultural Technology curriculum. Those who wish to specialize in chemical control of insects, and who plan to take graduate work leading to a professional degree in that field, will follow a program outlined as Insect Toxicology in the Agricultural Science curriculum. These students will be expected to take considerable mathematics and chemistry.

Students planning a career in Entomology should consult with their adviser in regard to the selection of electives best suited to their needs.

Horticulture

Conditions of climate, soil, and market combine to make New Hampshire a state with great horticultural possibilities. The Department of Horticulture offers instruction in three major fields: pomology (fruit growing, including small fruits), vegetable crops, and ornamental horticulture.

Students in Horticulture will have received the liberal training expected of a university graduate, a thorough preparation in the fundamental sciences underlying plant production and plant breeding, adequate training in general

horticulture, and specialization in a specific area in horticulture. The particular courses suggested by the adviser will be determined by the curriculum chosen by the student, i.e., Agricultural Business, and Marketing, Agricultural Science, or Agricultural Technology.

The courses offered acquaint the student with the problems and methods of the improvement, production, and marketing of fruit, vegetables, plants, or flowers. The training is such that superior students can pass the Federal Civil Service examinations required for entrance into positions with the United States Department of Agriculture. It is expected that students will take graduate work if they intend to make their professional career in research, or extension at the state or federal level. University of New Hampshire graduates with a good scholastic record have had no difficulty in securing fellowships or scholarships in other colleges and universities for graduate training.

The extensive University orchards, gardens, and greenhouses are used as laboratories for teaching and research.

Mechanized Agriculture

Specialization in the area of Mechanized Agriculture is offered by the Department of Agricultural Engineering. This major is designed to provide instruction and training in the fundamentals of agricultural science with particular emphasis on the technical phases of farm operation. The program of study prepares men for self-employment as farm operators and for commercial positions in the agricultural industry.

Mechanized Agriculture majors may find employment selling or servicing agricultural building materials, labor-saving mechanical equipment, irrigation systems, tractor, and field machinery. Graduates are qualified for positions as agricultural extension workers, as soil conservationists with the Soil Conservation Service, or as "rural use advisers" with electric utility companies. They may also find employment with farm insurance companies or agricultural management organizations.

As farming becomes more intensive and the mechanization of our farms more complete, there will be even greater opportunities for men with this type of training.

Poultry Science

Poultry Science courses offer students fundamental and special training in the practical and professional fields of poultry. The poultry industry is one of the fastest growing agricultural industries and it offers excellent opportunities for trained personnel in all its phases.

The program of study prepares students for various lines of work, such as production, sales and service with feed and equipment manufacturing concerns, marketing organizations handling poultry and eggs, extension work, commercial hatcheries, geneticists with breeding organizations, nutritionists with feed concerns, market analysts with industrial concerns. poultry farm managers, as well as for the operation of the individual's own farm. By supplementing undergraduate work with one or more years of graduate study, properly qualified students will find excellent opportunities in the professional fields of teaching, extension, and research, and in commercial fields.

Major students will find a variety of courses offered in the Department. A student interested in Poultry Science should take a selected group of these courses with the others optional, depending upon his interests.

A qualified staff member of the Department assists the student in planning his course of study so as to give consideration to the interest and abilities of each student.

The student selecting Poultry Science as his area of specialization can obtain a well balanced program in any one of the three curricula; Agricultural Business and Marketing, Agricultural Science, or Agricultural Technology.

The Department works closely with the New Hampshire poultry industry which ranks high in the country. In this connection, frequent trips are made to leading farms and industrial concerns and full discussion is given in the classroom to broad and pertinent problems of the industry.

All the facilities of the University Poultry Farm and the research laboratories are available for instruction purposes.

Pre-Veterinary

Students who contemplate veterinary medicine as a career should elect the Agricultural Science Curriculum. During the freshman year the pre-veterinary student will choose the curriculum outlined for all agricultural freshman, excepting that Chemistry 3 and 4 will be taken instead of Chemistry 1 and 2.

Because of the fact that the veterinary colleges of the country vary somewhat in their pre-veterinary requirements, it is necessary for each student to confer with his adviser relative to course work requirements of the sophomore year.

Although two years of pre-veterinary college work will meet the requirements of most schools of veterinary medicine, it is not to be regarded as a foregone conclusion that completion of such work will guarantee admission. All veterinary colleges give first preference for admission to applicants from their respective states. The few out-of-state students who will be admitted must show above average scholastic ability.

It is desirable that applicants to colleges of veterinary medicine have farm experience and, in fact, it is a prerequisite for admission to some.

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING

The purpose of this curriculum is to train men in the application of engineering knowledge and techniques to the problems of the agricultural industry. A sound academic background in the natural sciences and mathematics and the fundamentals of engineering and agriculture precede specialization in Agricultural Engineering. Most agricultural engineers are employed in the fields of farm structures, farm machinery, electric power, crop processing, and soil and water conservation. The student has an opportunity to select courses which are of interest to him and are related to these major phases of the profession.

Students who complete this course of study are qualifield for engineering service in rural communities; for teaching, research, and extension work in colleges, experiment stations, and government agencies; for positions related to the design, manufacture, and sale of farm machinery and farm power equipment; for advisory and managerial posts in connection with agricultural development; for positions with farm buildings and materials concerns; and for work relating to the use of electricity in agriculture. Opportunities for employment and progressive advancement after graduation are numerous in this expanding field of engineering.

Each candidate for a degree in Agricultural Engineering must complete at least 144 semester credits of the courses required in the four-year curriculum described below.

See page 42 for University group requirements.

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31-32	½	½
R.O.T.C.	0–2	0–3
Chem. 3-4. *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
*Math. 21-22, *Calculus B1 and B2*, or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
University group requirement C or D	3	
	16½-18½	17½-20½
Sophomore Year		
R.O.T.C.	2–3	0–2
Agron. 11, *Introductory Soils*	4	
C. E. (7), *Survey*		3
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
†Math. 23-24, *Calculus B3 and Differential Equations*, or Math. 27-24, *Multi-dimensional Calculus* and *Differential Equations*	5	3
M. E. 26, *Dynamics*		3
Phys. 23-24, *General Physics II, III*	4	4
	18-19	16-18
Junior Year		
Ag. Econ. 14, *Farm Management*		4
Ag. Eng. 32, *Farm Tractors*		3
Ag. Eng. 33, *Field Machinery*	3	
E. E. 39, *Electrical Engineering Fundamentals*	4	
M. E. 33, *Thermodynamics*	3	
M. E. 35, *Strength of Materials*	3	
Agricultural Elective	3	3
Technical Electives		9
University group requirement C or D	3	
	19	19
Senior Year		
Ag. Eng. 31, *Soil and Water Engineering*	3	
Ag. Eng. 34, *Agricultural Structures*		3
Ag. Eng. 35, *Electric Power and Processing*	3	
Ag. Eng. (61), *Special Problems in Agricultural Engineering*		3
C. E. 52, *Fluid Mechanics*		3
Engl. 23, *Writing of Technical Reports*	2	
Technical Electives	7	6
University group requirement C or D	3	3
	18	18

* Sequence will be assigned on the basis of mathematics entrance examination.

† Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

BACHELOR OF SCIENCE IN FORESTRY

Forestry students are educated for broad professional responsibility in the management of public and private forested lands. Graduates are active in resource development in all of the forested regions of the United States. The Bachelor of Science in Forestry curriculum is a combination of liberal arts, basic sciences, and courses in forestry. Forestry graduates work in supplying, growing, and utilizing the raw materials from the forests and with the wildlife, grazing, watershed, and recreational aspects of forest lands.

The Department is accredited by the Society of American Foresters, the national society of the profession.

The undergraduate forester follows a basic forestry curriculum. In addition, the student and his adviser develop a program of study according to the student's needs and professional goals. Elective courses are selected to give the student added development in his field of interests. Although specialization within forestry is normally done in a graduate program, the undergraduate student can explore areas in game management, forest engineering, forest recreation and wood technology, or in areas related to forestry including economics and government.

On completion of the junior year, forestry students are required to attend an eight weeks' summer session at Passaconaway in the White Mountains of New Hampshire. Instruction and field experience are provided on the 575 acres of woodland on or near the campus for teaching, research, and demonstration purposes. The student is expected to complete one or more periods of summer employment in forestry wherein his performance and progress receive careful appraisal.

GRADUATION REQUIREMENTS

The Bachelor of Science degree in Forestry outlined here includes the University, College, and departmental course requirements.

University requirements:

Physical Education for Men 31, 32; ROTC four semesters.

Students admitted to the University for the first time, beginning with the 1963-64 academic year, are required to complete 6 semester credits in each of the following groups. Completion of 30 or more credits in 3 or more areas in a given group satisfy the requirements of that group. Advanced placement in any group will satisfy that group requirement.

Group A — History 1 and 2.

Group B — Biology 1-2 and 3, Botany 1, Chemistry 1-2, Chemistry 3-4, Geology 1-2, Mathematics 7-8, Physical Science 1-2, Physics 1-2.

Group C — Economics 1-2, Geography 1, 2, Government 5, 6, and 8, Psychology 1, 37, 44, and 47, Sociology 1, 2, and 33.

Group D — Arts 31, 32, English 13, 14, English 15, 16, Humanities 1-2, Music 37-38, Foreign Languages at the 3-4 level, Philosophy (5), (8), 21, 22, Speech and Drama 21 and 24.

Some of the courses in the above groups are the same as those required by the College and will therefore fulfill both a College and a University requirement.

College of Agriculture requirements:

Candidates must complete 136 semester credits, including the departmental and the following College requirements: Agriculture 1; Botany 1; Chemistry 1, 2, or 3, 4; English 1, 2; Zoology 48; Biological Sciences (3 credits) in Botany, Entomology, Microbiology, or Zoology; Biochemistry or Chemistry (5 credits); Economics 1 (3 credits); Agricultural Economics, Economics, or Forestry 44 (3 credits); English and/or Speech (5 credits); Mathematics (3 credits); Physics (4 credits); Social Sciences (6 credits) in Government, Humanities, Psychology, Sociology, or Education 41, 57.

FORESTRY

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31-32	½	½
R.O.T.C.	0	3
Agr. 1, *Introduction to College*	1	
History 1, 2, *Introduction to Contemporary Civilization*	3	3
Chem. 1, 2, *General Chemistry*	4	4
Engl. 1, 2, *Freshman English*	3	3
For. 25, *Dendrology*	2	
Zool. 48, *Principles of Zoology*		3
Bot. 1, *General Botany*	4	
	17½	16½
Sophomore Year		
R.O.T.C.	3	0
Agron. 11, *Introductory Soils*	4	
C. E. (7), *Surveying*		3
Econ. 1, *Principles of Economics*	3	
Ent. 46, *Forest Entomology*		3
For. 27, 28, *Silvics; Applied Statistics*	3	3
Bot. 6, *Systematic Botany*		3
Sp. (15), *Public Speaking*		3
Group C requirement		3
Mathematics	3	
	16	18
Junior Year		
Bot. 56, *Plant Physiology*		4
Engl. (23), *Writing of Technical Reports*		2
Bio. Ch. 1, *Organic and Biological Chemistry*	5	
For. 29, *Silviculture*	3	
For. 43, 44, *Forest Mensuration; Forest Economics*	4	3
Physics 9, *Elementary Physics*	4	
Group D requirement	3	3
Electives		6
	19	18

For. 42, *Forest Engineering*	4
For. 45, *Timber Survey*	6
	10

Senior Year

For. 51, 66, *Forest Utilization; Wood Identification*	4	3
For. 59, (69), *Forest Protection; Forest Management*	3	4
Electives	10	10
	17	17

Forest Game Management curriculum is as above with For. 41, *Game Management Field Practice*, in the Summer Session in place of For. 42 and 45, and with the following courses added to the schedule: Zool. 4, 77, 78, For. 34, 55, and 56.

BACHELOR OF SCIENCE IN HOME ECONOMICS

The Home Economics Curriculum offers opportunity to combine education for home and family life with professional preparation in one of four major areas. The requirements in the freshman and sophomore years are essentially the same for all students. Sometime in the sophomore year the student selects one of the following four professional specializations:

1. GENERAL (Family Life). A careful selection of elective courses provides students with preparation for positions in nursery schools, community agencies, consumer services, Cooperative Extension Service, communications, business, foreign service.

2. HOME ECONOMICS EDUCATION. This program prepares students for teaching positions in junior and senior high schools, adult programs, Cooperative Extension Service, business, Peace Corps, and with university projects abroad and other related areas.

3. CLOTHING AND TEXTILES. Graduates of this area of specialization hold positions in merchandising, retailing, promotional work with pattern companies and manufacturers, advertising, and Cooperative Extension Service.

4. FOOD AND NUTRITION. In this major there are many career choices for those who qualify: as hospital dietitians, in college and industrial food services, in school lunch programs, with food and equipment companies, with newspapers, radio television, advertising agencies, or with public and private health services. With additional preparation the home economist does research in foods and nutrition in industry, with the government, or in universities.

GRADUATION REQUIREMENTS

A candidate for the Bachelor of Science degree in Home Economics is expected to complete 136 semester credits.

Students admitted to the University for the first time, beginning with the 1963-64 academic year, are required to complete six semester hours in each of the following groups.

Group A —History 1-2.

Group B — Biology 1-2 and 3, Botany 1, Chemistry 1-2, Chemistry 3-4, Geology 1-2, Mathematics 7-8, Physical Science 1-2, Physics 1-2.

Group C — Economics 1-2, Geography 1, 2, Government 5, 6, and 8, Psychology 1, 37, 44, and 47, Sociology 1, 2, and 33.

Group D — Arts 31, 32, English 13, 14, English 15, 16, Humanities 1-2, Music 37-38, Foreign Languages at the 3-4 level, Philosophy (5), (8), 21, 22, Speech and Drama 21 and 24.

Some of the courses in the above groups are the same as those required by the College and Department, therefore, one course may fulfill more than one requirement.

College Requirements

Physical Education 1, 2, 3, 4	4
Agriculture 1	1
English 1-2	6
English and/or speech elective	2
Chemistry 1-2 or 3-4	8
Chemistry or Biochemistry	5
Biology 1-2 or Botany 1, Zoology 48	6
Biological Science elective	3
Economics 1	3
Economics or Agricultural Economics elective	3

Departmental Requirements

Basic Design, Arts 23	2
Textiles, H. E. 4	3
Principles of Food Selection and Preparation, H. E. 18	3
Child Development, H. E. 25	3
Public Speaking, Sp. 15 or Basic Speech, Sp. 5	3
Family Development, H. E. 83	3
Home Management, H. E. 87	3

SUGGESTED PROGRAMS

For Freshmen

English 1-2	6
Introduction to College, Agr. 1	1
Basic Design, Arts 23	2
General Chemistry, Chem. 1-2 or 3-4	8
or Man and the Living World, Biol. 1-2	or 6
Introduction to Contemporary Civilization, Hist. 1-2	6
Textiles, H. E. 4	3
Principles of Food Selection and Preparation, H. E. 18	3
P. E. for Women 1-2	2
Electives	3–5
Total	34

For Sophomores

Principles of Economics, Econ. 1	3
General Chemistry, Chem. 1-2 or 3-4	8
or Man and the Living World, Biol. 1-2	or 6
Child Development, H. E. 25	3
Public Speaking, Sp. 15 or Basic Speech, Sp. 5	3
P. E. 3-4	2
Electives, required courses and/or professional specialization	15–17
Total	34

PROFESSIONAL SPECIALIZATIONS

A student plans the professional sequence with the adviser, using one of the following four curricula as a guide. Electives are planned to strengthen personal and professional interests and to broaden the general education background of the student.

1. *General* (Family Life)

Required Courses

Food and Nutrition elective	3
Child Development, H. E. 26	3
Interior Design, H. E. 31	3
Residence Planning, Agr. Eng. 2	2
Humanities 1-2	6
Home Management, H. E. 88	3

Professional specialization and electives to bring total credits for junior and senior years to 68.

2. *Home Economics Education*

Required Courses

Clothing and Textiles elective	3
Food and Nutrition elective	3
Child Development, H. E. 26	3
Residence Planning, Agr. Eng. 2	2
Home Management, H. E. 88	3
Interior Design, H. E. 31	3
Principles of Learning, Ed. 57	3
Principles of Teaching, 58 or 59	3
Methods in Home Economics Education, H. E. 91	3
Seminar in Home Economics Education, H. E. 96	3
Supervised Teaching in Home Economics, H. E. 94	7

Electives and professional specialization to bring total credits for junior and senior years to 68.

3. *Clothing and Textiles*

Required Courses

Introductory Sociology, Soc. 1	3
Interior Design, H. E. 31	3
Cultural Anthropology, Soc. 33	3
Social Psychology, Soc. 44	3

Developmental Psychology, Psych. 37	3
Psychology of Personality, Psych. 44	3
Drawing and Design, Arts 24	2
Clothing and Textiles Electives	15

Electives and professional specialization to bring total credits for junior and senior years to 68.

4. *Food and Nutrition*

This curriculum enables a student to fulfill the American Dietetic Association requirements for the Dietetic Internship program.

Required Courses

Menu Planning and Meal Service, H. E. 19	3
Experimental Foods, H. E. 71	3
General Microbiology, Micro. 1	4
Human Anatomy, Zool. 17	4
Human Physiology, Zool. 18	3
Educational Psychology, Ed. 41 or Principles of Learning, Ed. 57	3
General Psychology, Psych. 1	3
Industrial Psychology, Psych. 32	3
Principles of Accounting, B. A. 1	3
Nutrition, H. E. 73	3
Nutrition in Health and Disease, H. E. 74	3
Nutrition Seminar, H. E. 76	3
Quantity Foods and Purchasing, H. E. 21	3
Organization and Management of Institutional Food Service, H. E. 53	3

Electives and professional specialization to bring total credits for junior and senior years to 68.

Non-majors, both men and women, may elect courses in the Department of Home Economics.

. A curriculum leading to the Master of Science degree in Home Economics is outlined in the Graduate Catalogue.

TWO-YEAR NON-DEGREE CURRICULUM

The Thompson School of Agriculture offers several technical curricula to men and women who are interested in preparing for careers in the broad field of agriculture.

The College of Agriculture, University of New Hampshire, together with the Agricultural Education branches of the State and Federal Offices of Education, cooperate in providing this educational program.

The Thompson School of Agriculture has a staff of well qualified instructors who are selected on the basis of teaching ability, experience, and an understanding of the problems of young people preparing for a vocation in agriculture. In addition to the Thompson School staff, the entire staff of the College of Agriculture is available for consultation and for any other assistance which its members may be able to give. Each student is encouraged to confer with anyone on the University staff who may be of possible help.

In the development of the various curricula offered by the Thompson School of Agriculture, careful attention has been given to the fundamental aspects of both the practical and scientific phases of the students' educational program.

These curricula are designed particularly for those who wish to prepare for technical careers in agricultural production, conservation, manufacturing, processing, distribution, and marketing.

Positions Open to Graduates

There are many and varied occupations available to graduates successfully completing two-year technical curricula in agriculture. Those students who have demonstrated solid academic achievement, desirable personality traits, together with satisfactory placement experiences, quite frequently have a rather wide choice of positions. The following is a listing of some of the possibilities:

Producton. Operators and managers of dairy, general, light horse, fruit and vegetable farms; herdsmen on dairy and livestock farms; managing riding and driving light horses; florists, landscape gardeners, nurserymen, turf management production; woods foremen, clerks, timber cruisers and markers, scalers, technicians in timber stand improvement and woodland surveys.

Manufacturing. Managers, foremen, technicians in farm equipment plants, grain mills, fertilizer plants, agricultural chemical plants, and wood industry plants.

Processing. Proprietors, managers, foremen, technicians in milk plants, packing plants, poultry processing plants, fruit and vegetable processing plants, sawmills and planing mills, other wood processing plants, lumberyards and dry kilns.

Distribution. Proprietors managers, salesmen, fieldmen, and buyers for large and small business concerns, both wholesale and retail, engaged in the distribution of agricultural commodities including lumber and other wood products.

Conservation of Natural Resources. Soil conservation aids, county office managers, forestry aids, fires control aids, engineering aids, park and estate superintendents and technicians.

Miscellaneous. Artificial insemination technicians, research technicians, dairy herd improvement and breed association testers, agricultural representatives for banks, farm realtors, insurance agents, radio and television commentators, editors, and writers of news media, agricultural technicians serving with the Peace Corps.

Many graduates are now successful operators of farms, greenhouses, and landscaping businesses in New Hampshire and other states. Others are employed as farm managers, herdsmen, greenhouse managers, plant growers, and estate superintendents. An increasing number are being employed in many different capacities by agricultural cooperatives, feed, fertilizer, chemical and equipment companies and forest industries scattered throughout New England, the Northeast, and other sections of the country.

Admission Requirements

The Thompson School of Agriculture is open to both men and women. Graduates of high schools will be admitted irrespective of age. Applicants who are not high school graduates must be 18 years of age and must have had at least two years of high school work or its equivalent. The applicant

is not required to submit specific high school courses as prerequisites for admission. However, courses in mathematics, biology, and chemistry have proven to be of real value in preparation for future course work in the plant and animal sciences. It is recommended that each prospective applicant take the College Board Scholastic Aptitude Test during his senior year in high school.

Requirements for Graduation

The completion of the program requires two calendar years. The instruction is divided as follows: the student obtains two semesters of classroom and laboratory work on campus followed by a summer of supervised Agricultural Placement each year. However, it is possible for a student to attend the Thompson School of Agriculture for only two or more semesters, plus Agricultural Placement, and acquire considerable valuable information and first-hand knowledge of farming. Upon satisfactory completion of four semesters on campus with a minimum of 68 semester credits plus two summers of Agricultural Placement in the order described, the student will be awarded a certificate of graduation.

The Agricultural Placement will be adapted to the personal needs and interests of the individual. This work may be conducted on the home farm, on some good commercial farm known to the student, or in some related agricultural occupation in which the student plans to engage. All placement situations selected by the student, through his own initiative, must be approved by the school staff. Every effort will be made to find suitable placement positions for students who are unable to locate such positions for themselves.

This practical training, required during each summer, will be under the direct guidance and supervision of the teaching staff. Certain records and reports are required of the student while on placement, and no student will be granted a certificate until such records and reports are complete.

Curricula

Six curricula of study are available: General Agriculture, Agri-Business, Animal Science, Horticulture, Forest Technician, and Soil and Water Conservation Technician. The student will select the one he wishes to pursue and may elect courses in other fields in order to provide for a well-balanced program.

Facilities for Instruction

Facilities of the University including the University farm, dairy herd, milk plant, poultry plant, horticulture farm, livestock department, greenhouses, and laboratories, are available for instructional purposes.

Financial Aid

The purpose of the financial aid program is to assist able and promising students who are unable to meet their educational expenses from their own or their family's resources. This may be done in one of the following ways or in a combination of two or more. *Deferred Payments.* Students who cannot pay their University bills in full may request permission to pay on the deferred payment plan. The initial payment which is due prior to registration, shall be not less than ⅓ of the total amount of the University bills. The balance is paid in 2 equal installments

in the following two months. *Employment.* Various types of employment, on and off the campus, are usually available. *Tuition Grants.* A resident of New Hampshire is eligible for consideration for a tuition grant. The amount varies from $100 to full tuition. The award is based on financial need. *Loans.* The University of New Hampshire has a loan program which makes limited amounts available to students in need of this kind of assistance. No interest is charged until graduation or separation from the University.

Additional information and applications may be secured from the Financial Aids Office, Room 108, Thompson Hall.

Additional Information

Persons who are interested in the Thompson School of Agriculture should request a catalogue from the Thomson School of Agriculture, Putnam Hall, University of New Hampshire, Durham, N. H.

The College of Liberal Arts

Everett B. Sackett, *Dean*

Melville Nielson, *Associate Dean*

Departments

The Arts
Education
English
Foreign Languages and Literatures
Geology and Geography
Government
History
Microbiology
Music
Occupational Therapy
Philosophy
Psychology
Sociology
Speech and Drama
Zoology

The departments of Chemistry, Mathematics, and Physics in the College of Technology and the departments of Botany and Entomology in the College of Agriculture offer major programs for students in the College of Liberal Arts.

PURPOSE AND OBJECTIVES

It is the purpose of the College of Liberal Arts, as a center of learning and scholarship, to help all of its members achieve an understanding of the heritage of civilization and to educate them in the tradition of the past and the realities of the present so that they may recognize and act upon their obligations to the future.

The College endeavors to meet the educational needs of each student through the development of interests and skills which, combined with the student's potential, makes possible the living of a richer and more useful life.

ORGANIZATION

The development of common interests and the coordination of educational efforts in behalf of students in the College are promoted by divisions as follows: Biological Sciences, Humanities, Physical Sciences, Social Sciences, and Teacher Education. The personnel of each division includes all faculty members assigned to the College, and to departments of other colleges which are authorized to offer major programs or prescribed curricula in the College of Liberal Arts, or which have been invited to join by vote of the Liberal Arts faculty.

The *Humanities Division* is composed of the staffs of the departments of The Arts, English, Foreign Languages and Literatures, Music, Philosophy, and Speech and Drama. The *Social Sciences Division* is composed of the staffs of the Whittemore School of Business and Economics, and the departments of Government, History, Psychology, and Sociology. The *Physical Sciences Division* is composed of the staffs of the departments of Geology and Geography, and the departments of Chemistry, Mathematics, and Physics in the College of Technology. The *Biological Sciences Division* is composed of the staffs of the departments of Microbiology and Zoology, and the departments of Botany and Entomology in the College of Agri-

culture. The *Division of Teacher Education* consists of the members of the instructional staff of the University who are teaching professional courses in Education. These include courses in the problems of teaching the subjects offered in the public schools and the courses in Physical Education, in The Arts, and in Music that are designed to prepare teachers.

The offerings of the College of Liberal Arts consist of two groups: the *General Liberal Arts* curriculum and the *Prescribed* curricula. Teacher Preparation curricula are also provided.

GENERAL LIBERAL ARTS CURRICULUM

The General Liberal Arts curriculum is intended primarily to provide a broad liberal program and general education leading to the *Bachelor of Arts* degree. Requirements for this degree are given on page 91.

A student enrolled in the General Liberal Arts curriculum will major in some subject or field of knowledge. Some of these major programs offer, at least in part, direct professional training.

The objectives, opportunities, and requirements of majors in the General Liberal Arts curriculum are described in the paragraphs which follow. It is possible also for students in the General Liberal Arts curriculum to arrange programs of study in addition to those described below, although such students will be held to the University and College requirements of the General Liberal Arts curriculum. *Students interested in arranging special programs of study should consult the Associate Dean of the College.*

The Arts

It is the belief of the Department of The Arts that art is best taught with a practical center. An experimenal arts laboratory (the Student Workshop) and a continuing series of exhibitions of art are therefore basic factors in this department. The courses offered provide an opportunity, within the liberal arts framework, for the serious art student to acquire a thorough knowledge of the basic means of visual expression. In addition, these courses are designed to offer foundation experience for students interested in art but who are majoring in other departments in the University.

The Department of The Arts offers two programs leading to the following degrees: Bachelor of Arts major in The Arts (see options described below) and Bachelor of Science in Art Education (see page 87). Students majoring in The Arts must complete the following courses: Arts 23-24, *Basic Design and Drawing*, and Arts 31, 32, *Introduction to The Arts*. The student majoring in The Arts has the choice of three optional programs: (1) Painting and Graphics, (2) Crafts, (3) History of Art.

The optional programs offered in the Department are as follows:

Option I. *Painting and Graphics.* Introductory courses in design, drawing, graphics, painting and photography, followed by a comprehensive workshop integrating all these disciplines, form the core of this option. Courses to be pursued include art history and electives in the crafts. Students will be prepared for continued professional study in the fields of painting, design, and commercial art. Those students seeking careers in college or secondary school teaching will be qualified to enter programs of graduate study leading to the master of fine arts and master of arts in teaching degrees. The student is required to take the following courses: Arts 25, 26, 27, 39, Workshop 50, and one upper level course within the option. Interested students should consult the supervisor, Professor John W. Hatch.

Option II. *Crafts.* Introductory courses in ceramics, jewelry, metalsmithing, weaving, and woodworking are offered in this option to acquaint the student with the basic crafts. Within this option the student is required to choose one area for concentration. The areas open are the following: ceramics, metal, and wood. The aim of this option is to provide the student with the opportunity to explore the craft field, and, by developing techniques and familiarity with materials, be adequately prepared for further study at the graduate level. Twenty-four credits in crafts courses are required in this option, with a concentration of 12 credits in one of the available areas (ceramics, metal, or wood). Interested students should consult with the supervisor, Professor Winifred Clark.

Option III. *History of Art.* The arts of the eastern and western parts of the world amount to a rich legacy. The courses of study in this option are designed to serve a twofold purpose. First they make available for students in the general liberal arts programs, and elsewhere in the University, an opportunity for a full historical survey of the subject. Second the courses provide a foundation in fact, theory, and historical problems for a student who desires to continue the study of this subject on the graduate level. The very number of artistic objects and the variety of creative subjects which these objects exemplify make the survey of more than one historical period necessary for competence in this subject. A student electing to major in the history of art is required to take a minimum of five survey courses (classical, modern, medieval or Renaissance, northern painting or baroque art, Oriental or American art). In addition, the student is required to take one seminar, preferably in his senior year, Arts 97, *Problems in Art,* which deals with further refinement of problems the student has already discovered, as well as advanced critical and bibliographical tools. The student is expected to take courses in at least one European language, and in related areas in the liberal arts: philosophy, history, and literature. Creative talent in any area of art is not a prerequisite in this option. However, the familiarity with the techniques of the various arts and crafts offered in the department is strongly suggested. This option is designed to prepare a student for further work in three professional areas: teaching, museum work, conservation. Interested students should consult with the supervisor, Professor James A. Fasanelli.

Biology

Students who are interested in a broad background in the life sciences are advised to major in Biology. Such students will be required to take courses in botany, entomology, microbiology, and zoology in building up a program. The field, however, is so inclusive that the majority of students will find it desirable to include one or two additional courses in one of the sub-divisions, such as Botany, Microbiology, or Zoology. In addition to students who desire to study Biology for general education, it is suggested that those who are interested in *Applied Biology* and *Secondary-School Teacher Preparation* register as Biology majors. Students who are interested in Forest Game Management are advised to consider registration in the curriculum of that name offered by the Department of Forestry in the College of Agriculture.

Teacher Preparation. Students who are planning to teaching Biology in secondary schools are urged to plan for practice teaching during the senior year. As few positions are available in any year for teaching Biology alone, a student should include courses in his program of study which will qualify him for teaching other sciences.

Applied Biology. Students preparing for positions which involve the application of the science of Biology, such as those frequently listed by the federal civil service, the state governments, and industry, should follow the general program of Biology majors and should elect one or two additional courses in fields of Applied Biology. The Division is well fitted to assist in the preparation of students for work in fish and game research, conservation education, and in state departments of conservation. Students preparing for professions in this group should plan to secure advanced degrees, since positions in these fields are difficult to secure without graduate study. Students who are interested in hospital laboratory work should consult the *Medical Technology* curriculum.

Satisfactory completion of the requirements of a Biology major will generally qualify students for admission to graduate schools to specialize in Biology or in one of its major subdivisions.

Students who major in Biology are expected to complete courses offered in the Division to a total of 24 semester credits (exclusive of Biology 1-2 or 3 and Zoology 43) with a grade of C or better. The minimum course requirements for Biology majors include Microbiology 1; Botany 3; one course selected from Botany 6, 12, 42, or 56; Entomology 2; Zoology 4; and one other course in Zoology (except Zoology 97, 98). *Biology majors are also required to complete Chemistry 3-4 and eight additional hours in physical science (Chemistry, Geology, Mathematics, Physical Science 1-2, or Physics). These courses in physical science cannot be offered as major credit.*

Students interested in majoring in *Biology* are advised to consult with the supervisor, Professor Paul A. Wright.

Botany

Students who are interested in plant life are advised to consider registration as majors in Botany. Botany majors with suitable undergraduate backgrounds may enter the field of secondary education or become research technicians. Botany majors, other than those whose interest is secondary-school teaching, research technique, or a general education, should expect to continue in graduate study here or elsewhere. Government work, institutional research, certain types of industrial positions, and college teaching are open to Botany students with advanced preparation. The principal fields of concentration in Botany are: (1) Pathology, (2) Physiology, (3) Taxonomy, (4) Ecology, (5) Morphology and Anatomy, (6) Cytology.

Students who major in Botany must complete courses offered by the Department, to a total of 24 semester credits with grades of C or better. Courses in other departments closely related to the major courses may be counted with the consent of the major supervisor. A broad background in chemistry and other biological sciences is considered essential for most major students.

The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

Students interested in majoring in *Botany* are advised to consult with the supervisor, Professor Albion R. Hodgdon.

Chemistry

Students who are interested in the study of Chemistry will find opportunities in such fields as individual work involving the development of processes or production activities or sales work based on a scientific knowl-

edge of the marketable products, the teaching of Chemistry and allied subjects in secondary schools or of Chemistry in colleges, and graduate study for those students who are interested and particularly proficient in their undergraduate work.

The University offers two channels for study of Chemistry: majoring in the subject in the College of Liberal Arts, or enrolling in the Prescribed curriculum in *Chemistry* in the College of Technology. In the College of Liberal Arts a major should complete Chemistry 3-4, *General Chemistry,* or preferably Chemistry 5-6, *Inorganic Chemistry,* certain courses in Mathematics and Physics, and in addition other courses offered by the Department in *Analytical, Organic, and Physical Chemistry* to a minimum of 24 semester credits, with grades of C or better. According to the student's interests, other supporting subjects may be elected to form a broad program of study and to prepare for one of the opportunities listed above.

The Department is equipped to furnish the preparation necessary for teaching Chemistry in secondary schools. As very few positions are available in any year for teaching Chemistry alone, a student should consider a program of study which may qualify him for teaching Chemistry and other sciences, and should consult with the Chairman of the Department of Chemistry and the Chairman of the Department of Education. Students who are interested in teaching Chemistry in college are advised to plan on graduate study.

Students who plan to major in *Chemistry* are advised to consult with Alexander R. Amell of the Department of Chemistry as early in their college program as possible.

Education

Students who are interested in preparing themselves for teaching are referred to the section on "Preparation for Teaching" starting on page 86.

Graduates of two- or three-year normal schools or teachers colleges, and who are teaching or supervising in elementary schools, may major in Elementary Education. They are required to complete at the University, with grades of C or better, 12 semester credits of work in elementary education selected from the courses in that subject as a part of the total credits which are required of them as candidates for the degree of Bachelor of Arts. Such students will select the remainder of their major programs with the advice and approval of the Chairman of the Department of Education.

Some courses offered in Education are designed to be of interest to the general student.

English

The Department of English offers two programs of study: the *Literature* major and the *Teaching* major.

The *Literature* major must complete English 13 and must earn grades of C or better in 24 semester credits in literature courses numbered above 50; 6 credits must be in Shakespeare (English 57; 58), 6 credits in American literature (this requirement may be satisfied by English 15, 16, but the 6 credits thus earned cannot be counted toward the 24 major credits), and an additional 12 credits in at least three centuries of English literature prior to the twentieth.

The Teaching major must meet the state certification requirements for teaching. He must also take the following courses, 24 credits of which must be passed with the grade of C or better:

English 13, 14
English 16
English 85
English 86
English 87, 88, and 89
English 57 or 58
English-Education 91
Speech 28 or 62
Speech 64

Students who are interested in majoring in *English* should consult with the supervisor, Professor Sylvester H. Bingham.

Entomology

The Department of Entomology offers various courses for students who wish to specialize in the study of insect life, insect control, and insects in relation to man. There are many fields open to those qualified in Entomology. There are opportunities for employment in public institutions and organizations, and in addition, there are many opportunities for employment with commercial and industrial firms which frequently employ college graduates who have majored in this field of study. Graduate study is desirable for the student who seeks high achievement in Entomology. A more intensive program in Entomology may be secured in the curriculum offered in the College of Agriculture.

Students who major in *Entomology* are expected to complete successfully courses offered by the Department, to a total of 24 semester credits, with grades of C or better. Courses in other departments may be counted with the consent of the major supervisor.

Outlines of specific suggested programs of study are available to the student upon request to the supervisor, Professor James G. Conklin.

Foreign Languages and Literatures

A major in Foreign Languages and Literatures may be of interest to the following groups of students:

(1) Those who wish to do college teaching in foreign languages and literatures. Graduate study is indispensable for such work, but preparation may be made for it by a certain amount of undergraduate specialization.

(2) Those who plan to teach foreign languages in secondary schools. As most high school language teachers are obliged to teach more than one language, or one language in combination with other subjects, such students should plan to concentrate in a single language and its literature, but should map out a program including another language, or a number of courses in English, history, or the social sciences. Prospective teachers should consult the Chairman of the Department, Professor R. Alberto Casas, and the Chairman of the Department of Education.

(3) Those who intend to enter other professional fields in which a background in foreign languages and literatures is desirable. Such a field, for example, might be that of library service. Most library schools require two foreign languages.

(4) Any students who feel free to plan their college program without too specific reference to a vocation, and who have a special interest in foreign languages and literatures.

Since most graduate schools require a knowledge of two foreign languages, *all* students who may possibly do graduate work in *any field* should obtain a reading knowledge of French and German.

Students majoring in the Department of Foreign Languages and Literatures must designate *French, German, Latin,* or *Spanish* as their particular major. The following courses cannot be counted for major credit: French 1, 2, 3, 4; German 1, 2; Greek 1, 2; Italian 1, 2; Latin 1, 2; Russian 1, 2; Spanish 1, 2. A major must comprise a minimum of 24 major credits, 21 of them in a particular language and its literature. The remaining 3 credits may be earned in other designated courses in the Department.

The special supervisor for majors in *French* is Professor Louis J. Hudon; for majors in *German,* Professor Hermann W. Reske; for majors in *Latin,* Mr. George Doig; for majors in *Spanish,* Professor R. Alberto Casas.

Attention is called to the combined major in *History and Literature.*

General Physical Science

A student having broad interest in physical science, but no professional objective in any one of the recognized sciences in this field, may register as a *General Physical Science* major. Many students who have majored in General Physical Science have combined this specialization with courses in Education leading to secondary school teacher certification.

Students who major in General Physical Science must complete each of the following courses, and achieve in them an overall grade point average of 2.3 or better: Mathematics 7-8, *Fundamental Mathematics,* 21, 22 or 25, 26, *Calculus,* and 30, *Astronomy;* Chemistry 3-4, *General Chemistry,* and 21, *Semimicro Qualitative Analysis;* Geography 21, *The Weather,* and 22, *Climates of the World;* Geology 1-2, *Principles of Geology;* and Physics 1-2, *Introductory Physics.* Students who are interested in choosing *General Physical Science* as a major should consult with the supervisor, Professor Jerome M. Pollack.

Geography

Geography satisfies man's ancient curiosity about distant places, and, less exotically, his need for further knowledge of the "home area". Modern geography is best defined as the discipline that describes and interprets the variable character from place to place of the earth as the home of man. As such, geography is an integrating discipline, studying many types of phenomena that are significant to understanding the character of areas or places. Because its integrating character brings it into contact with many other fields of knowledge, geography forms an excellent core discipline for a liberal education. Thus, students who have a basic curiosity about areas or the regions of the world, and desire a liberal education can effectively obtain one by majoring in *Geography.* Those wishing to prepare for careers as professional geographers are advised to concentrate their course work in geography and closely related fields, and should plan to go on to graduate training after completing an undergraduate major in geography.

Today, as in the past, most professional geographers hold positions in educational institutions, and the demand for personnel in this field can only increase. In addition, many geographers now find employment for their skills in various branches of the Federal and state govenments, and most recently in market research and plant location services for business and industry.

Students who major in geography are required to take Geography 1 and 2 and additional courses in Geography or related fields approved by their supervisor to a total of 24 semester credits with grades of C or better. The

24 credits should include Geography 4, 7-8 (elementary topical geography), nine credit hours of intermediate level courses, the seminar in geography, and three credit hours of *Special Problems in Geography.*

Students who are interested in majoring in *Geography* should consult with the supervisor, Professor William H. Wallace.

(The major curriculum in Geography has been authorized. It is planned to initiate the program in the academic year 1964–1965).

Geology

The aim of the geological sciences is to construct the physical and biological history of the earth by the study of the formative processes acting on the earth. This inculdes knowledge of the constituents that make up the earth, an understanding of the evolution of the earth's structural framework and surface features, and the interpretation of changes in life and the biological environment through time.

Students who are interested in the earth sciences, both those who expect to make some phase of geology their life work, and those who desire to build a program of liberal studies around a core of geological and related subjects, are advised to register as majors in *Geology.*

The search for new sources of essential mineral resources and the development of new uses for certain minerals have emphasized the need for men trained in the earth sciences. Positions as mining geologists, petroleum geologists, mine operators, federal and state survey geologists, and university and college professors of geology and mineralogy have been successfully filled by graduates of the University who have majored in Geology. Other former major students are teaching in high schools or are in business, some in fields where their geologic preparation is useful.

Students who major in Geology are expected to complete Geology 1-2, *Principles of Geology,* and, in addition, courses in Geology or related courses approved by the supervisor to a total of 24 semester credits with grades of C or better. The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

At the end of the senior year, a student who majors in Geology must, after consultation with his supervisor, submit either a satisfactory paper or pass a written comprehensive examination.

Students who are interested in majoring in *Geology* are advised to consult with the supervisor, Professor Jerome M. Pollack. After a student's major interest is determined, the advice, assistance, and counsel of one or more additional members of the Department will be sought where a special area of concentration is contemplated by the student.

Government

The courses offered by the Department of Government are designed to aid the student in gaining a knowledge of the nature, functions, and problems of government, and of the place of government in the modern world. For this general purpose, courses are offered in public affairs — local, state, national, and international. Some courses listed by the Department are chiefly intended to provide information needed for intelligent and responsible citizenship and to provide a part of a liberal education. Others are of a specialized nature and have been planned to provide basic preparation for professional work. A few are intended to stress the historical and philosophical development of the growth of political thought and institutions.

By specializing in one of several programs of Government, the major student may prepare himself for graduate study in political science and government, public administration, research in government, the study of law, graduate study for the foreign service, or teaching government courses in secondary schools. Nearly all leading graduate schools require the prospective student to do the Graduate Record Examination during his senior year. Information may be secured in the Government Department office. Students who are preparing to teach government courses in the secondary schools should check their planned program of study with the Department of Education. Ordinarily, prospective teachers of government courses will find it necessary to teach related courses in the social sciences.

Majors in *Government* have an unusual opportunity for mastering research techniques and gaining practical information concerning state and local government in New Hampshire through work as an intern in an approved public or private agency. For this program the student should enroll in Social Science 81, *Internship*, with the prior permission of the Chairman of the Department of Government. Further opportunity for similar research may be gained in Government 65.

Majors in *Government* are required to take Government 5, *Elements of Political Science*, and Government 6, *Principles of American Government*. Students who expect to major in *Government* are advised to register for these courses during the freshman or sophomore year. Students majoring in Government are also required to complete a research paper approved by the staff. This project constitutes the chief part of *Research in Government Problems*, Government 65. A major consists of a minimum of 24 semester credits of work with grades of C or better in Government and in any related courses which may be approved by the supervisor. The 24 semester credits should include not less than 12 in courses above 50. Not more than 9 credits earned as an intern in Social Science 81 may be counted toward the completion of the major requirements. Each student will be counseled individually and his program of study planned for his needs. Opportunity is available for the more able student to share in a program of Independent Study within the Department and to share in an Honors Program.

Students interested in electing *Government* as a major should meet with the supervisor, Professor John T. Holden.

History

History, as a field in which to major, may be of interest to the following groups of students: (1) Those who wish to do college teaching in history. Graduate study is indispensable for such work, but preparation may be made for it by a certain amount of undergraduate specialization. (2) Those who plan to teach history in secondary schools. For such a position, training in other social studies is highly desirable, if not absolutely necessary. The student is therefore advised to keep in touch with the Department of Education, as well as with the Department of History, with a view to satisfying teaching certification standards and building a well-rounded program of studies. (3) Those who intend to enter other professional fields in which a considerable amount of historical knowledge is desirable. Such a field, for example, might be that of library training in which an historical preparation would rank with study in literature as a background, or the increasingly important profession of archivist. (4) Any students who feel free to plan the college program without too specific reference to a vocation, and who have a special interest in history.

Students who major in History must earn 24 semester credits in courses in History (exclusive of History 1, 2) with grades of C or better. These 24 credits should include a minimum of six semester credits each from Group A, Group B, and Group C (see the description of courses offered by the Department), and 12 semester credits of the 24 should be in courses numbered above 50. A student who majors in History must prepare a satisfactory paper in his field of concentration or take a comprehensive examination. If the student writes the paper, he must secure approval of the subject chosen from the Chairman of the Department before December 15 of the student's senior year and the completed paper must be filed with the Chairman before April 15 of the year in which the degree is to be granted. The examination will be given on a prearranged day before April 15.

Students planning to major in History should consult with the supervisor, Professor Marion E. James.

History and Literature

Students who desire a broad education may take a combined major in *History and Literature*. Students who plan to enter library service may also find here a desirable major. The program of this major offers an opportunity to study the history and literature together of France, of Germany, or of Spain. A still broader survey of European history and of its literature is also possible. The program involves the completion of 24 semester credits with grades of C or better in one of the following groups of courses, of which 12 credits should be in History and 12 credits in Languages:

I History 9, 10, 19, 20, 65, 66, 67, 70, 83, 84;
Spanish 5, 6, 51, 52, 55, 56, 65, 66;

II History 19, 20, 65, 66, 67, 70, 83, 84;
French 5, 6, 41, 59, 60, 64, 67, 68, 70, 81, 82;

III History 19, 20, 65, 66, 67, 70, 83, 84;
German 5, 6, 59, 62, 63, 64, 65, 66, 67, 90.

A student who has met the major requirements in *History and Literature* and other requirements of the General Liberal Arts curriculum (page 91) will be recommended for the Degree of Bachelor of Arts with the notation "History and Literature" on the Commencement program.

Students' registration cards may be signed by either Professor Marion E. James, Chairman of the Department of History, or Professor R. Alberto Casas, Chairman of the Department of Foreign Languages and Literatures.

Students electing option I, II, or III will be encouraged to do a considerable part of their reading for the History courses in Spanish, French, or German, respectively.

Mathematics

Career opportunities in mathematics include teaching at both secondary and college levels and scientific research and consulting work in business, industry, and government. Many positions are open to holders of the B.A. degree with a major in *Mathematics*. Most such positions require a solid foundation in basic mathematics and provide on-the-job training in any specialties involved. On the other hand, the number of positions in mathematics that require graduate work is steadily increasing. Fortunately, the

program required by most industrial employers. The following program is designed to meet these ends:

Math. 25-26 or 21-22-23	Calculus
Math. 24	Differential Equations
Math. 27	Multidimensional Calculus
Math. 31	Set Theory
Math. 61-62	Higher Algebra
Math. 67-68	Real Analysis

Two additional mathematics courses

While most secondary school teachers do graduate work, most of them begin their teaching careers on the basis of the B.A. degree. Thus, the undergraduate program of the prospective secondary school mathematics teacher should include adequate preparation for the position. Current trends in secondary mathematics curricula demand a high level of specialized training for the teacher. The following program is designed to meet these demands:

Math. 25-26 or 21-22-23	Calculus
Math. 31	Set Theory
Math. 41	Probability
Math. 61-62	Higher Algebra
Math. 55	Geometry
Math.-Ed. 91	Teaching of High School Mathematics

Two additional mathematics courses

A student who majors in *Mathematics* must complete one or the other of these sequences.

Prospective *Mathematics* majors are advised to include calculus in their freshman year programs and to consult as early as possible with the Chairman of the Mathematics Department, Professor M. Evans Munroe.

Microbiology

Students interested in the study of microorganisms, including the bacteria, rickettsiae, and viruses, should register as majors in *Microbiology*. Such students may prepare themselves for a career in city, state, or federal government service, or a position with universities, research institutes or industrial organizations. Opportunities are available in the areas of general microbiology, medical, public health, or veterinary microbiology, agricultural microbiology, and industrial microbiology.

Students who major in Microbiology are expected to complete courses offered by the Department, and by related departments, to a total of 24 semester credits, with grades of C or better. *A course in Organic Chemistry is also required by Microbiology majors, but cannot be counted as part of these 24 major credits.* The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

Students interested in majoring in *Microbiology* are advised to consult with the supervisor, Professor Lawrence W. Slanetz.

Music

The Department of Music offers a major program in the General Liberal Arts curriculum. Studies such as history, literature, and appreciation of

music endow the student with cultural values which enrich his entire life. Instruction offered in the Department of Music is designed to develop musicianship, the ability to perform and capacity to teach, supplemented by the general education required by the College of Liberal Arts. The broad scope of subjects available within the Department equip the student with a basis for professional competency and at the same time provide the foundation and stimulus for graduate study.

Instrumental and vocal instruction are given in private lessons, while class instruction provides for the pursuit of academic studies. Student recitals, instrumental and vocal ensembles, Men's and Women's Glee Clubs, the University Concert Choir, Symphony Orchestra, and Symphonic Band afford both laboratory and concert experience in a variety of performance settings.

The expanding and dynamic force which music is fast becoming in contemporary American society is reflected by increased demands for teachers of music; performers; music librarians; radio, recording, and television musicians; music therapists; and higher standards of quality and performance of music in places of worship.

The Department of Music offers courses leading to the Bachelor of Science degree with a major in *Music Education* (see page 88 for curriculum requirements).

A major in *Music* is offered with three options in concentration. All students must complete the requirements of the basic theory courses: Music 9-10, 11-12, 13-14, and 15-16; and the basic history-literature course, Music 37-38. In addition, the specific requirements of each option are given below:

I. Music History: advanced theory (4 credits); advanced history and literature (12 credits); Music 23 and/or Music 26 (8 credits).

II. Applied Music: qualified students may major in voice, piano, organ, strings, woodwind or bass (a student choosing this option must pass a performance examination before the Department of Music staff); advanced theory or literature (4 credits) and applied music (16 credits — 2 credits per semester). Voice majors must take the following languages to graduate in this program: Italian 1-2; German 1; French 1. A senior recital also must be presented.

III. Theory: emphasis on musical composition; advanced theory (12 credits), advanced history (4 credits), and Music 23 (8 credits).

Students majoring in *Music* must earn grades of C or better in all required *Music* courses.

The Department of Music is a Member of the National Association of Schools of Music.

Prospective majors in *Music* are advised to consult with the supervisor, Professor Karl H. Bratton.

Philosophy

The Greeks understood philosophy as the love of wisdom, that ardent desire to know which Aristotle called the natural aspiration of all men. From this original impulse toward knowledge the sciences and the humanities developed. The goal of the special sciences is the detailed study of limited fields of inquiry. Philosophy aims at a comprehensive knowledge of the whole, a single perspective which will include things as seemingly diverse as matter, space, time, life, spirit, society, beauty, and the divine. And since wisdom is not quite the same thing as knowledge, philosophy also seeks to bring together the discoveries of the special sciences, to

assess their significance, and to apply this knowledge to the conduct of life.

Courses in philosophy, taken early in a student's program of study, provide an introduction to some of the dominant themes in the history of ideas and enable the student to get a view of the forest in which he will later examine the trees. Taken near the end of his studies, such courses afford a perspective of where the student has been and how much he has left unexplored. Philosophy 5 and Philosophy 8, at the introductory level, are designed to present such an inclusive view as well as to acquaint the student with the specific nature of philosophic inquiry and with some of the fundamental philosophic problems. Courses in the intermediate group provide for more systematic inquiry in the history of philosophy and in some of the more important branches of the subject in which problems common to philosophy and other disciplines, such as art, literature, religion, and psychology, can be investigated. The advanced courses are for majors and for other students willing to acquire the necessary background for such work. In most cases, such background can be acquired by taking Philosophy 21, 22.

William James once said that, ultimately, the really important question is why there is something rather than nothing. Students who agree with James might consider a major in philosophy. Students interested in philosophy as a major should take Philosophy 21, 22 as early as possible since this course is the foundation for most of the advanced work in the department.

Students who major in philosophy must earn a minimum of 24 semester credits in philosophy or related subjects with grades of C or better, including the following courses in philosophy: 3, 21, 22, 55, 56 and six hours of work in the group 89, 90, 99.

At the end of the senior year students majoring in philosophy must pass a comprehensive written-oral examination covering (1) the history of philosophy and (2) some field of systematic study (e.g., ethics, aesthetics, metaphysics) selected by the student.

Students interested in majoring in philosophy should consult with the supervisor, Professor Robert W. Jordan.

Physics

The major in *Physics* is intended to prepare students for a diversity of interests in the application of this fundamental science. Broad in scope, the program provides electives so that a student may supplement his work in physics by that in other fields, such as mathematics and the allied sciences. The intermediate courses are intended to give the student a thorough grounding in fundamentals in a particular branch of physics. Opportunity is given in the senior year for the major student to do some elementary investigation of his own choosing under guidance. Graduates of this major will find opportunities for employment in the various industrial, government, and armed services laboratories. If particularly proficient in their undergraduate work, they may elect graduate study leading to advanced degrees.

Students are required to complete 24 semester credits, in addition to the introductory courses, with grades of C or better. A student must elect Physics 23-24, preferably in the sophomore year, as an introductory course. If Physics 1-2 is elected in the freshman year, a student may be placed in an advanced section of Physics 23-24. If Physics 18 is elected in the freshman year, the regular sequence may be taken in the sophomore year. Since proper preparation in mathematics is essential, the student should elect in the freshman year if possible, Mathematics 21-22, in order to have the pre-

requisites for the courses that follow. If Mathematics 7 has been passed with a grade of B or higher, students in the College of Liberal Arts may be admitted to Physics 18 with the specific approval of the Department of Physics. Liberal Arts students who wish to register for advanced courses in physics should discuss the mathematical prerequisites with the Department of Physics. Seniors are required to participate in a colloquium, Physics 97-98.

The Department is able to furnish the preparation necessary for teaching physics in secondary schools. As very few positions are available for teaching physics only, a student should consider a program of study which will qualify him for teaching physics and another science, such as mathematics, biology, or chemistry. The student interested in such a program should consult with the chairmen of the departments of Education and Physics. Students who wish to major in *Physics* are advised to consult the Department Chairman, Professor John A. Lockwood, early in their college program.

Psychology

A primary function of the Department of Psychology is the provision of an academic major which will contribute to the liberal education of the undergraduate student. It is intended that the experiences which are provided by the major will help to develop the broad viewpoint which is so highly valued as a characteristic of the liberal arts graduate. By majoring in Psychology it is hoped that the student will develop an appreciation of the role of scientific methods in studying behavior, and at the same time, achieve a better understanding of himself and others. Some students may wish to major in Psychology in order to prepare themselves for advanced study and a career in one of the following fields: college teaching and research; personnel work in industry or government; supervision and psychological testing in mental hospitals, juvenile courts, city school systems and child guidance clinics; counseling and guidance in secondary schools and colleges; or clinical practice. For non-majors, the study of psychology will be helpful in teaching, nursing, social work, business or industrial management, or in professions such as medicine and law in which human relations are of primary importance.

Students who major in *Psychology* are required to complete 24 semester credits with grades of C or better in courses in psychology and in such related courses as may be approved by the supervisor. Each student majoring in *Psychology* must complete six credits from the following group: Psychology 57, 58, 67, 77, 78, 83; also, he must complete six credits from Psychology 37, 44, 54, 60, 63. Finally, all majors must take Psychology 95, *The Integrating of Psychology*, and pass a departmental comprehensive which is offered as a part of this course.

Psychology 98, *Seminar in Psychology*, is an honor's course which is open to senior students who have a 3.0 grade point average in psychology and are sponsored by a member of the staff. Psychology 57, *Experimental Psychology*, and Psychology 67, *Statistics in Psychology*, should be taken by all psychology majors who are planning to enter graduate school.

Students who wish to major in *Psychology* are advised to consult with the supervisor, Professor Eugene S. Mills.

Sociology

The major in *Sociology* is for students who desire a liberal education with emphasis on study of the organization and differentiation of society,

including study of the research methods developed in recent years for a better understanding of social phenomena; students who intend to do graduate work in sociology; or students who plan to attend a graduate school of social work but prefer a broader choice of undergraduate electives than the prescribed Social Service curriculum permits.

The Social Service curriculum, with its field experience and its concentration on pre-professional courses, not only prepares students to enter graduate schools of social work but also has been quite successful, for a number of years, in preparing them for junior positions in social work prior to graduate study.

Students who wish to teach sociology in secondary schools are advised that such teachers usually have to teach related social studies. Students with this vocational aim should consult with the Chairman of the Department of Education.

It is recommended that majors in *Sociology* take Sociology 1, *Introductory Sociology*, during their freshman or sophomore years. In addition, they must complete a minimum of 24 semester credits with grades of C or better in Sociology (or in any related course approved by the supervisor). Sociology 85, 86, *Development of Sociological Thought*, Sociology 92, *Fields of Sociology*, and Sociology 75, 76, *Methods of Social Research*, are required. At the end of the senior year majors must pass a written comprehensive examination.

Students who are interested in choosing *Sociology* as a major should consult with the supervisor, Professor Richard Dewey.

Speech and Drama

The Department of Speech and Drama offers a major with two options: *General Speech* and *Drama*. A major in either *General Speech* or *Drama* makes an excellent focal point for those students desiring a liberal education combining course work in the humanities, literature, the arts and social sciences. The purpose of this major is to offer a broad program for students interested in: a liberal education stressing the speech arts; a pre-professional background for careers in such fields as public service, teaching, law, ministry, public relations, social administration, and personnel work; basic preparation for the teaching of speech and drama, direction of debate, drama and other speech activities in secondary schools, community theater direction, and professional training for television, theater, and speech correction.

Courses in speech and drama may also be elected for their cultural value by students pursuing other majors.

Those seeking a major in *General Speech* should acquire a good background in English language and literature, history, government, philosophy, and psychology. They should be able to speak and write well, and they should acquire a reasonable proficiency in public speaking and oral reading.

Those seeking a major in *Drama* should combine that study with a wide variety of liberal arts courses in such fields as history, dramatic literature, philosophy, the arts, music, and psychology.

The following three-credit courses are required of all Speech and Drama majors: Basic Speech (without major credit), Discussion (without major credit in General Speech), and Introduction to Theater (without major credit in Drama).

For majors in the *General Speech* option, the following three-credit courses are required: Debate, Theater and Its Drama, Rhetoric in the Western World, Stagecraft, and Speech Correction. Six credits are also required in specific courses in literature* in related departments as approved

by the major adviser and not also used to satisfy Group, College, or University requirements. Individual students may be allowed to substitute Television and Radio Workshop for Stagecraft with the approval of the major adviser. Stagecraft will contribute considerable background for the course in Television and Radio Workshop.

For majors in the *Drama* option, the following three-credit courses are required: Theater and Its Drama, Stagecraft, Acting, Directing, and Scenic Design and Lighting. Six credits are also required in specific courses in dramatic literature* in related departments as approved by the major adviser and not also used to satisfy Group, College, or University requirements.

All majors will be required to write a satisfactory paper and/or satisfactorily complete a special project during their senior year. The student must secure approval of the subject of the paper and/or the special project from his major adviser before the Christmas vacation of his senior year and file the completed paper and/or project with the major adviser before the 15th of May of the year in which his degree is to be granted.

To count for major credit the courses required must be completed with a grade of C or better.

Students who wish to major in *Speech* and *Drama* should consult with the supervisor, Professor Joseph D. Batcheller.

Zoology

Zoology, the science of animal life, is the study of the structure, functions, development, and classification of the various animal forms. The student may major in *Zoology:* because of a general educational interest in the subject; because of his avocational interest in nature study; or to prepare for professional work in pure science or in applied zoology. Fish and game research, important in the conservation of our natural resources, is an example of applied zoology. Students who are interested in entering the fields of applied zoology should plan to secure advanced degrees since positions in these fields are difficult to obtain without graduate study. Undergraduate preparation for students who are interested in applied zoology generally should parallel that of any students planning to enter graduate work in zoology. Students who are interested in Forest Game Management are advised to consider registration in the curriculum of that name offered by the Department of Forestry in the College of Agriculture.

The University of New Hampshire's location on tidewater and near the open ocean provides an unusual opportunity for the study of marine zoology and marine ecology.

All students who major in *Zoology* must earn grades of C or better in 24 semester credits in Zoology. Related courses in other departments may be counted for major credit with the consent of the supervisor. Minimum course requirements for Zoology majors include: Zoology 4, 17-18, and Botany 3 or 6; eight of the 24 major credits must be in courses numbered 51-100. *Zoology majors are also required to present credit for Chemistry 3-4 and a course in Organic Chemistry (Chemistry 45, 51-52, or Biochemistry 1.) These courses in Chemistry cannot be counted as part of the 24 major credits.*

Students who are interested in a *Zoology* major are advised to consult with the supervisor, Professor Philip J. Sawyer.

---

* Each student's individual program will be considered with regard to breadth and individual needs in assigning courses in related departments. Approval must be secured in advance of registration for credit for courses in this area.

OTHER PROGRAMS OF STUDY

Although pursuing his studies in the College of Liberal Arts in one of the major fields just outlined, the student may also prepare himself for some related objectives. Two of these are described below, and there is enough freedom of election to make it possible for the student, in consultation with his supervisor, to arrange others.

Pre-Dental

Students who plan to enter a school of dentistry may follow the Premedical curriculum (page 85), or they may elect to major in almost any field offered under the General Liberal Arts curriculum (pages 67-81). The student's program should include courses in comparative anatomy, physics, and organic chemistry. Students who plan to enter a school of dentistry, either before or after achieving the bachelor's degree, are advised to consult with Professor Paul E. Schaefer.

Pre-Law

While the various bar associations and law schools do not prescribe a specific undergraduate curriculum for future lawyers, they recommend that a student who contemplates entering law school should plan a study program which will develop breadth of view and facility of expression. They also urge him to acquire a background of information concerning the society in which he lives and the forces which have shaped modern institutions. They urge him particularly to perfect his use and understanding of the English language in writing and speaking.

The courses considered most helpful are those which develop oral and written expression, deal with man's social, economic, and political institutions, provide an understanding of the human mind, and develop the art of thinking. A course in the elements of accounting may be useful.

A number of law schools require the *Law School Admission Test of* students seeking admission; each law school will advise a student upon request whether or not he will be expected to take the test in partial satisfaction of admission requirements. Particulars of the examination may be obtained at the office of the Department of Government.

Students who plan to enter law school after graduation are advised to consult with Professor John H. Holden, Chairman of the Department of Government, as soon as they have made their decision.

PRESCRIBED CURRICULA

Several prescribed programs of study, intended to provide preparation for business or professional life, are available to students in the College of Liberal Arts. They are arranged in such a manner as to permit considerable specialization while conserving the breadth and general culture of the students enrolled in them. All *prescribed* curricula lead to the degree of Bachelor of Science.

Medical Technology Curriculum

There is now a large and increasing demand for medical technologists. Public health and medicine depend more and more upon the laboratory. Professional technicians are needed to perform various laboratory techniques and tests, such as blood typing, blood counts, tissue sections, urinalyses, and bacteriological and serological tests. Positions in this field are available in hospital laboratories, physicians' and surgeons' clinics, and in health department laboratories.

Students who are interested in becoming medical technologists should register in the Prescribed curriculum in *Medical Technology*. In this program students will take their freshman, sophomore and junior year's work at the University and their last year's work at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. After satisfactorily completing the courses at the School of Medical Technology (Biology 61-62), the student is awarded 32 credits toward the Bachelor of Science degree. This program also qualifies the student for the examination for the Medical Technologist's certificate administered by the Registry of Medical Technologists of American Society of Clinical Pathologists. Thus a student can obtain the B.S. degree from the University and the M.T. certificate in a four-year period. Students who complete this curriculum are well qualified for work in any hospital or medical laboratory. The curriculum is outlined on pages 96-97.

At the present time, the fees for the senior year include a University tuition fee of $50 for New Hampshire residents and $120 for non-residents and a maintenance fee of $700 (including room and board) at the Mary Hitchcock Memorial Hospital School of Medical Technology. The latter institution has a stipend program which provides $600 for students meeting the requirements of this program.

Students in the *Medical Technology* curriculum must obtain grades of C or better in 24 semester credits from the following courses: Zoology 17, 18; Microbiology 1, 8, 53; Chemistry 17, 45; and Biochemistry 56.

Students who in their junior year decide not to take the training program at the Mary Hitchcock Memorial Hospital School of Medical Technology will find it possible to transfer to a major in the General Liberal Arts curriculum, such as Microbiology or some other biological science. In such case, they would have to satisfy requirements of the General Liberal Arts Curriculum.

Students interested in the Prescribed curriculum in *Medical Technology* are advised to consult with the supervisor, Professor Theodore G. Metcalf.

Nursing Curriculum

Any student who is interested in nursing as a career is encouraged to consider the *Nursing* curriculum. It affords opportunity for examinations for registration as a nurse and enables the student also to secure a college degree. The breadth of training beyond that usually received in a hospital training school is increasingly in demand, particularly for those who aspire to executive or supervisory positions. The curriculum (see page 97) prepares for nursing and also permits the student some specialization in other fields related to nursing.

The student must satisfactorily complete three years of work (a minimum of 96 credits) in residence at the University of New Hampshire with a minimum cumulative grade point average of 2, and graduate from a school of nursing approved by the University. The length of the training period will vary with the several schools of nursing. *This curriculum is intended to precede hospital training.*

Students interested in selecting the *Nursing* curriculum are advised to consult with the supervisor, Professor Edythe T. Richardson.

Occupational Therapy Curriculum

An ally to the medical profession, occupational therapy is any activity, mental or physical, prescribed by a physician and administered by a registered therapist to aid in the recovery or the rehabilitation of the patient.

The successful practice of occupational therapy requires not only thorough academic preparation but also suitable personality combined with judge-

ment, dependability, tact, tolerance, patience, and will to serve. A high degree of mental and physical health is essential. Occupational therapy requires physical vitality and emotional stability.

The course admits both men and women who can meet entrance requirements.

Before the beginning of the sophomore year, in the case of freshman students who are interested in the Occupational Therapy curriculum (or before admission into this curriculum in the case of students who transfer from other majors or from other colleges), a series of tests will be given to assist the supervisor in advising the student of his or her fitness for entering this curriculum. The curriculum is outlined on page 98.

Because of the highly specialized nature of the Occupational Therapy curriculum, students are advised to enter this program not later than the beginning of their sophomore year; otherwise, they should expect to spend additional time in working toward the Bachelor of Science degree. Students seeking to transfer to the University of New Hampshire from other accredited collegiate institutions must arrange, through the Admissions Office, an appointment with the Department Chairman prior to admission to the curriculum in order that the applicant may be fully aware of the problems involved in completing the requirements for the degree.

The curriculum in *Occupational Therapy* is designed to satisfy the occupational therapy curriculum requirements of the Council on Education and Hospitals of American Medical Association as well as to offer a four-year course leading to the Bachelor of Science degree. This includes the theoretical subjects needed in the medical fields as well as a wide range of skills and crafts used as therapeutic occupational therapy modalities in the treatment of patients.

It is recommended that the student interested in the *Occupational Therapy* curriculum spend one summer in an occupational therapy department in either a hospital or a camp caring for handicapped children. This should be done before the student enters the clinical affiliation program.

At the completion of the requirements of the curriculum, the student will spend a minimum of nine months in student affiliation in approved hospitals or services under the direction of a registered occupational therapist. The occupational therapy student is expected and should plan to take the nine months' clinical affiliation period in a continuous sequence directly after receiving her assignments from the supervisor of the curriculum. *When this internship is satisfactrily completed, the student is entitled to a Certificate of Occupational Therapy.* The student is then qualified to take examination for registry in the American Occupational Therapy Association. The standard examination is sent out by the Association and administered by the University. A fee of $15 is required by the Association for each examination. While the present demand for qualified therapists is far in excess of the supply, there are relatively few opportunities for those who have not completed the requirements for and entered the Registry of the American Occupational Therapy Association.

A student affiliation fee of $95 for residents of New England and $200 for non-residents of New England is payable in advance to the University by those students who enter the clinical affiliation program.

The minimum of nine months of student affiliation in approved hospitals is divided as follows:

General Medicine, Surgery, and Pediatrics — 3 months

Psychiatry — three months

Physical Disabilities — three months

The American Medical Association requires a physical examination including a tuberculin test prior to hospital affiliation.

Expenses vary during the period of student affiliation. Room, board, and laundry are given students by *some* hospitals; meals only in other hospitals. *In all cases, the University must approve living arrangements for student affiliates.* Students will furnish regulation white uniforms which are required for student affiliation.

Students who are registered in the curriculum must obtain grades of C or better in the following courses: Zoology 17, 18, 19, 64; Occupational Therapy 41, 42, 44, 46, 48, 49, 50, 51, 56. Students interested in the curriculum are advised to consult with Professor Marguerite Abbott, Chairman of the Department.

Pre-Medical Curriculum

Young men and women who are interested in careers as physicians or surgeons may select the *Pre-Medical* curriculum. Students who successfully complete this curriculum will be eligible for admission to Class A medical schools. However, owing to the large number of applicants for admission to medical schools, usually only those students who stand in the upper third of their class can expect to be admitted.

It is highly desirable that a pre-medical student secure a bachelor's degree, although some medical schools do not require it as a condition of admission. The four years of pre-medical work will not only give the student a foundation for his future medical training, but will also give him an opportunity to secure a broad general education.

The curriculum is outlined in detail on page 99.

Students pursuing the Pre-Medical curriculum must obtain a grade point average of 2.5 or better for the required courses in Biology, Chemistry, Physics, and Zoology.

Students who are interested in this curriculum should consult with the supervisor, Professor Paul E. Schaefer.

Social Service Curriculum

Social Service includes, among others, the following fields: family case work, child care, child placement, settlement and neighborhood house, institutional work for defectives and dependents, state and local welfare work, probation, correctional school and prison service, Y.M.C.A. and Y.W.C.A. service, municipal playground direction, child guidance clinics, community chest work.

For full recognition in social service, it is important for a man or woman to have completed the two-year professional course in a graduate school of social work. The best preparation for admission to such a graduate school is either a broad liberal arts education with 40 to 60 hours of credit in the social sciences, including a major in *Sociology*, or the *Social Service* curriculum. For able students, scholarship aid toward meeting expenses of graduate study is often available.

There is a continuing serious shortage of qualified workers in nearly all the branches of social work. For this reason, a number of students who complete the *Social Service* curriculum find employment each year, in public welfare, group work, etc., before they commit themselves to graduate study. The program is outlined in detail on page 100. Students registered in it must obtain a grade of C or better in 24 semester hour credits from the following courses: Sociology 27, 44, 71, 73, 74, 75, 76, and 97, and Psychology 44 and 54.

Students interested are advised to consult with Miss Pauline Soukaris, Department of Sociology.

PREPARATION FOR TEACHING

The University of New Hampshire offers at the undergraduate level two types of secondary school teacher preparation programs and an elementary school program.

General Liberal Arts curriculum students wishing to teach in secondary schools may follow an advisory program of studies called the University Teacher Preparation program. A student following this program takes Education 41 in the sophomore year. In the junior year he takes Education 57, 58. In the first semester of the senior year he takes Education 59 and an Education 91 course in the field of his major teaching interest. The second semester is devoted to practice teaching.

There are also Prescribed curricula preparing teachers in the fields of Agriculture, Art, Home Economics, Music, and Physical Education (see following pages).

The program for those preparing for elementary school teaching is an unusual one combining liberal education with professional preparation. The student follows the General Liberal Arts curriculum for three years and then devotes the entire senior year to professional study and practice teaching, enrolling in Education 71-72, a 32-credit course.

All of the teacher education programs are selective. For details of the standards set, see the prerequisites for courses in the Department of Education.

Courses in Supervised Training

The work in Supervised Teaching is under the direction of the Coordinators of Student Teaching. Students teach under the immediate direction of selected classroom teachers in schools approved by the University.

In the Supervised Teaching courses the student participates in the conduct of class exercises and in the control of the classroom, at first chiefly as an observer, but gradually entering into teacher responsibilities until complete charge of the classroom is assumed.

This work is required in the University Teacher Preparation programs, but will be open only to students whose applications are approved by the Chairman of the Department of Education and the Coordinators of Student Teaching in the subject or subjects in which the applicant desires to do supervised teaching. *Applications should be filed in the office of the Department of Education on or before November 15 of the academic year in which the superivsed teaching is to be done.*

The applicant must also complete with a grade of at least C a course in the problems of teaching the subject in which he desires to do supervised teaching.

Accreditation

The teacher preparation programs of the University are accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary teachers, secondary teachers, and school service personnel, with the master's degree as the highest degree approved.

Guidance of Students Preparing to Teach

Students who come to the University of New Hampshire for the purpose of preparing themselves for the teaching profession should consult the Chairman of the Department of Education in their freshman year. Other students who are seriously considering teaching as a possible profession are urged to consult him before making a decision.

Completion of the approved teacher preparation programs of the University qualify a student for certification as a teacher in virtually all states. There are a few which have unusual requirements for certification. The Chairman will be glad to advise students regarding these requirements.

PRESCRIBED CURRICULA IN TEACHING PREPARATION

Agriculture Teacher Preparation Curriculum

A student electing the Agricultural Education curriculum must meet the general and specific requirements for a degree applicable to students registered in the College of Agriculture.

This curriculum will provide the professional training for agricultural teachers, county agricultural agents, and county 4-H club agents. Those persons who wish to prepare to teach vocational agriculture will meet state certification requirements as well as the College of Agriculture graduation requirements. Normally the student will follow a broad general agricultural program rather than specialization.

Interested students should consult with the supervisor, Professor William H. Annis.

Art Education Curriculum

This curriculum is designed to prepare teachers and supervisors of art in the public schools. It is based upon the demands for teachers who possess developed skills in the arts and a broad general culture in addition to a specialized preparation in Art Education. The satisfactory completion of the curriculum will satisfy the initial certification requirements for teachers of art in the public schools in New Hampshire and in other states.

Freshmen who plan to enter this curriculum should elect Arts 23-24, *Basic Design* and *Drawing and Design,* in their first-year program.

A grade of C or better must be achieved in all Arts courses required in the curriculum, which is described on page 101.

The program should be worked out in consultation with the Chairman of the Department of Education.

Students seeking to transfer to the University of New Hampshire from other accredited collegiate institutions must arrange an appointment with the supervisor of the curriculum or the Department Chairman prior to admission to the curriculum in order that the applicant may be fully aware of the problems involved in completing the requirements for the degree.

Interested students should consult with the supervisor, Professor George R. Thomas.

Commercial Teacher Preparation Program

This, an option in the Secretarial curriculum, will prepare the student to teach commercial subjects in secondary schools. The student in this program will not be required to take a minor but will be expected to take Education 41, *Educational Psychology,* in the sophomore year, Education 57, *Principles of Learning,* and Education 58, *Principles of Teaching,* in the junior year; ES-Ed. 91, *Problems of Teaching Commercial Subjects in Secondary Schools,* in the first semester of the senior year, and ED-CS 94, *Supervised Teaching of High School Commercial Subjects,* in the second semester of the senior year. For a detailed description of this option, see page 124.

Students interested in registering for either the Secretarial curriculum or the Commercial Teacher Preparation option should consult with Professor Doris Tyrrell.

Home Economics Education

This curriculum is designed to prepare teachers of home economics for the secondary education program. See page 61 for the program outlined for Home Economics Education. Satisfactory completion of this curriculum will meet the certification requirements for teachers of home economics.

Students who are interested should consult with Professor Marjory A. Wybourn of the Department of Home Economics.

Music Education Curriculum

This curriculum is designed to prepare teachers of music for the public schools. It is based on the demands for teachers possessing sound musicianship and a broad general culture in addition to a specialized preparation in music education. This program is fully accredited by the State Department of Education and complies with standards set up for certification of teachers and supervisors of music in most states. Training for teaching in both the elementary and secondary schools is included in the program. The Department is also actively affiliated with the Music Educators National Conference.

To be admitted to this curriculum the student must give evidence of having a sound musical background. *Freshmen who plan to enter this curriculum must elect Music 9-10 and four hours of Applied Music in their first year program.*

A grade of C or better must be achieved in all music and education courses required in the curriculum.

Public school music teachers must maintain a satisfactory standing musically with other professional musicians in the community and should be able to play or sing acceptably. For this reason, *16 semester credits in Applied Music are required before graduation.* Students will be encouraged to accumulate up to eight semester credits in one instrument or in voice. In addition, all candidates are required to meet minimum standards of performance in piano, voice, a woodwind instrument, a brass instrument, a string instrument, and percussion. Candidates are expected to meet the piano and voice requirements by the end of their junior years. The minimum instrumental standards may be met by special examination, or may be demonstrated during the time the candidate is registered for Applied Music in these instruments. Details of minimum standards of performance may be obtained from the Supervisor of the Music Education curriculum.

Recitals. Students enrolled in the *Music-Education* curriculum must accumulate a minimum of 24 points in the sophomore, junior, and senior years. Attendance at each concert or recital constitutes one point.

The curriculum is outlined in detail on page 102. Students who are interested should consult with the supervisor, Professor John B. Whitlock.

Physical Education Teacher Preparation Curriculum (Men)

This curriculum is for men students who plan to prepare themselves for positions as teachers of physical education, teachers of physical education and coaches of athletic teams, or teachers in two subject-matter fields and coaches of athletic teams in secondary schools (see page 104). *It is open to men who have satisfactorily completed the freshman year, and are approved by the Department of Physical Education for Men for admission to Physical Education as a field of concentration.* A grade of C or better must be achieved in Physical Education 23, *Principles of Physical Education;* Physical Education 61, *Problems of Teaching in Physical Education;* Physical Education 65, *Administration of Physical Education in Secondary Schools;* and in 24 semester credits in the second teaching major.

This curriculum requires the satisfactory completion of a second teaching major of 24 semester credits and a teaching minor of 12 semester credits in subjects taught in high school. Students who are interested in this program should consult with the Director of Physical Education.

Physical Education Teacher Preparation Curriculum (Women)

For women students who plan to prepare themselves for positions as teachers of physical education or for positions in recreation education, the University has organized the Physical Education Teacher Preparation curriculum for Women (see page 105). This curriculum will enable women to elect, at the end of the sophomore year, the *Physical Education* option or the *Recreation Education* option. Furthermore, students have the opportunity, if they so desire, to prepare themselves to teach in a subject matter field as well as in physical education. The curriculum is open to women who have satisfactorily completed the freshman year and are approved by the Department of Physical Education for Women for admission to that field of concentration. It provides an opportunity for students to teach physical education and to assist in recreation programs, under supervision, in nearby schools and recreation centers.

Any student in this curriculum who is planning to teach in areas in addition to physical education must complete with an average grade of C or better a second teaching major of 18 semester credits in subjects taught in high schools.

For students choosing the *Physical Education* option, the following courses offered by other departments are suggested as valuable electives: Arts 4, *Crafts;* Microbiology 5, *Public Health and Sanitation;* Speech 15; *Public Speaking;* Home Economics 84, *Personal, Family, and Community Health;* Humanities 1-2, *Humanities;* Music 37-38, *Introduction to Music Literature;* Psychology 37, *Developmental Psychology;* Psychology 47, *Mental Hygiene;* Sociology 1, *Introductory Sociology;* Sociology 45, *Rural-Urban Sociology.* Physical Education 24, *Organized Camping,* is also recommended. Students in this curriculum are advised to choose non-professional electives whenever possible. Those planning to enter graduate study should elect a foreign language.

In the Physical Education option a grade of C or better must be achieved in 24 semester credits in the Physical Education courses required by the curriculum. A minimum of one summer as a camp counselor or playground leader is highly recommended for students choosing the *Physical Education* option.

Students choosing the *Recreation Education* option are advised to become skilled in at least two of these five fields: art, drama, music, outdoor education, or physical education. The following courses offered by other departments are suggested as valuable electives for recreation specialists: Arts; Speech 15, *Public Speaking;* Government 6, *Principles of American Government;* Music 23, *Piano;* Music-Education 90, *Problems in the Teaching of Elementary School Music;* Psychology 47, *Mental Hygiene;* Psychology 63, *Differential Psychology;* Sociology 33, *Cultural Anthropology.* Physical Education 56, *Health Education,* and Physical Education 63, 64, *Theory of Team Sports,* are also recommended.

Recreation Education students desiring a major emphasis in Forestry Recreation and outdoor education are advised to take Forestry 63, *Forest Recreation.* Those interested in a major emphasis in Hospital Recreation are advised to take Zoology 19, *Kinesiology,* and Physical Education 55, *Remedial Gymnastics.*

To make certain that the *Recreation Education* option contains some experience under working conditions, each student is required to secure dur-

ing a summer before graduation a minimum of 8 points in actual leadership of recreational activities in such places as community centers, hotels, playgrounds, and camps where supervision will be authorized. A record of such activities will be kept by the student and submitted to the supervisor of the curriculum for crediting. Each week will constitute 1 point.

The students in the Recreation Education option must complete, with a grade of C or better, 24 semester credits in the physical education, arts, music, outdoor education, and drama courses offered by the curriculum.

Under Physical Education 1, 2, 3, 13, 14, 5, 6, Physical Education curriculum students are required to include certain activities, in many cases in sections especially reserved for them. *During the freshman* year the student must register for one quarter each of the following, preferably in the order listed: fundamentals, tennis, badminton, skiing, lacrosse (and swimming, basketball, and volleyball if they have not had them previously); in the *sophomore year*, tennis (int.), hockey, stunts and tumbling, figure skating, elementary games, skiing (int.), dance survey, outdoor education and archery; in the *junior year*, golf, folk and square dancing, modern dance (elem.), and modern dance (int.). In addition, apparatus and gymnastics should be taken in the senior year.

For those who are highly skilled in the activities mentioned and for *Recreation Education* majors, substitutions are made with the approval of the supervisor. (For example, practice leadership and American country dance are required in the *Recreation* option.) Further dance and other activities not listed are included in courses for students in the Prescribed curriculum.

Students who are following any teacher preparation curriculum in the University are urged to include for Physical Education: American country dancing, folk dancing, recreation workship, hockey, basketball, volleyball, and softball.

The curriculum is outlined on page 105. For further information concerning this curriculum consult the supervisor, Professor Marion C. Beckwith.

HONORS PROGRAM

The College of Liberal Arts offers an Honors Program as a possible means of challenging students of exceptional ability.

This program has three divisions: 1. Honors offerings for each of the freshman and sophomore years. At present this applies only to English 1, 2, History 1, 2, and Government 5, 6, and 8. 2. Departmental honors programs, developed and administered by those departments choosing to maintain an honors program. 3. An upper-division, general honors program with two objectives: first, to provide an honors minor program for those students who wish to do honors work but whose major departments do not maintain honors programs; and second, to schedule special lectures, seminars, and other academic activities for all honors students.

To date, the following departments have adopted honors programs: Foreign Languages and Literatures, Government, History, and Sociology. Students wanting information about a department's program should consult the department chairman.

The upper- division general honors offerings provide continuity with the freshman-sophomore honors curriculum. Should independent study be involved in such a program, a junior may register for a total of 6 credits of independent study and a senior for a total of 12 credits (of which no more than 9 are in his major field of concentration) during the academic year.

The honors minor program gives an honors option to a student majoring in a department not maintaining an honors program, and may be undertaken by such a student with the approval of his departmental supervisor, the Honors Council, the Dean, and a Council member teaching the subject in which the minor would be undertaken. The Council member supervises the student's activities.

It is expected that all honors students will maintain a cumulative average of at least 3.0. Professor Robert C. Gilmore is Director of the Honors Program.

DUAL DEGREE PROGRAMS

Students may formally combine studies in Liberal Arts and in a professional curriculum in one of the other colleges of the University. Normally these joint programs will involve attendance for five years and two Bachelor's degrees will be awarded upon satisfactory completion of the requirements of both areas. If a student is approved for a dual degree program involving the College of Technology, initial registration will be in the College of Technology, but an adviser will be assinged from both areas so that an integrated program of study may be planned from the outset in order to accomplish the student's objectives in the most efficient and academically-sound manner.

THE FORD FOUNDATION SCHOLARSHIP PROGRAM

A limited number of freshmen each year are selected from those who apply for a special five-year program leading to the B.A. and M.A. degrees. The program is limited to superior students who expect that their chosen vocation shall be teaching at the college level. The regular General Liberal Arts requirements for the B.A. degree and the Graduate School requirements for the M.A. degree are basic requirements. In addition the student is expected to attend special seminars, incorporate a minor area of study as well as a major, complete special work in mathematics, languages, reading, and writing. During the last three years of the program, he will be assigned to his major department as an intern in teaching.

Prospective freshmen with superior high school records who are interested in this program should consult the principal or counselor in their high schools or write to the Director of Admissions at the University for more information.

REQUIREMENTS FOR DEGREES

The degree of Bachelor of Science is conferred upon those students in the College of Liberal Arts who successfully complete the requirements of a *Prescribed* curriculum. The degree of Bachelor of Arts is conferred upon all students in the College of Liberal Arts who successfully complete the requirements of the *General Liberal Arts* Curriculum.

A student's candidacy for a degree will be determined by his having satisfied the University, College, major, or curriculum requirements in force at the time of his admission to the College either as a beginning student or as a transfer. A student may petition to satisfy the University, College, major, or curriculum requirements that may be in force at any time during his residence. Such a student shall be held, however, for *all* the academic requirements of the catalogue under which he seeks a degree; not a portion thereof. *The new catalogue becomes effective on July 1 of each year.*

Each candidate for a degree in the College of Liberal Arts must complete successfully 128 semester credits and achieve a 2 *grade point average* in all courses completed at the University. In addition, he must complete the requirements given below and those of the major field, or Prescribed curriculum, as stated in the preceding pages.

I. General University Requirements

Physical Education for men	Freshman year
Physical Education for women	Freshman and sophomore years
R.O.T.C. for men	Freshman and sophomore years
English 1-2	Freshman year

University Group Requirements*

Group A, History 1, 2

Group B, Natural Sciences: Biology 1-2, 3; Botany 1; Chemistry 1-2†, 3-4; Geology 1-2; Mathematics 7-8; Physical Science 1-2; Physics 1-2.‡

Group C, Social Sciences: Economics 1-2; Geography 1, 2; Government 5, 6, 8; Psychology 1, 37, 44, 47; Sociology 1, 18, 33.

Group D, Humanities: Arts 31, 32; English 13, 14, 15, 16; Humanities 1-2; Music 37-38; Foreign Languages 3-4 level courses; Philosophy 5, 8, 21, 22; Speech and Drama 21, 24.

1. Six semester hours must be completed in each group.
2. A student shall be considered as having satisfied the group requirement for any group in which he has received advanced placement credit.
3. A student who has accumulated 30 or more credits in three or more areas in the field of a given group shall be considered as having satisfied the group requirement.
4. It is expected that these requirements will normally be completed by the end of the sophomore year except in case one of them is being satisfied under "3" above.

II. General College Regulations

1. Special Requirements of the Freshman Year

(If not completed in the freshman year, they must be taken as soon as available.)

**a. English 1-2, *Freshman English*

**b. A biological science (Biology 1-2; Botany 1, Biology 2; or Biology 3) or a physical science (Chemistry 1-2†; 3-4; or 5-6; Geology 1-2; Mathematics 5, (7); or 7-8; Physical Science 1-2; Physics 1-2‡).

**History 1, 2, *Introduction to Contemporary Civilization*

---

* These requirements are effective for students entering the University after June 1, 1963.

** Not counted toward fulfillment of Group or Major requirements.

† Chemistry 1-2 does not fulfill the requirement for pre-medical students or Biology majors nor the prerequisite for further courses in Chemistry.

‡ Students who expect to major in Physics should not register for Physics 1-2, but should elect Mathematics 21-22, and Physics 18, to be able to schedule Mathematics 23, 24, and Physics 23-24 in the sophomore years. (See description of Physics major, page 78.)

2. Special History Requirement *(to be taken in the freshman year except for those students who are registered for the freshman program of the Medical Technology curriculum)*

3. All freshmen in the College of Liberal Arts are assigned on registration to advisers who counsel them until they have officially selected major departments or Prescribed curricula. Official declaration of a major or a prescribed curriculum is accomplished by a special form which must bear both the adviser's and the supervisor's signature.

4. Students in both the *General Liberal Arts* curriculum and *Prescribed* curricula are advised against over-specialization. Although no attempt is made to limit by regulation the number of courses in a major or the professional courses in a Prescribed curriculum, more than 36 semester credits in courses in the major department, or more than 66 semester credits in professional courses in a Prescribed curriculum, constitute excessive concentration and the supervisor or Dean of the College may not approve schedules that reveal over-specialization.

5. Students are advised that a limited amount of credit earned in music laboratories, discussion and debate practice, and theater practice may be counted toward a degree. (See music laboratories and speech and drama courses in debate practice and theater practice in the Description of Courses.)

III. General Liberal Arts Curriculum Requirements

Each candidate for a degree in the *General Liberal Arts* curriculum must satisfy (1) the General University Requirements, (2) the General College Requirements listed below and (3) those of the major as described in the preceding pages.

1. Special Language Requirement

All students who pursue the *General Liberal Arts* curriculum are required to pass a test in one of the following languages: Classical Greek, French, German, Italian, Latin, Russian, or Spanish. The test is based on the achievement of students after completion of beginning courses in languages at the University of New Hampshire (French 1, Spanish 1, German 1, Russian 1-2, Latin 1-2, Greek 1-2, Italian 1-2). Usually two or three years of high school work are adequate preparation for this test. This examination will consist of an oral-aural test as well as a comprehensive written examination and will test the student's ability to comprehend and read texts of moderate difficulty and answer questions based on that text.

A student may also complete his college language requirement by passing one of the following courses: French 1, Spanish 1, German 1, Russian 2, Greek 2, Italian 2, and Latin 2, or any language course numbered higher.

In the event a student does not pass the competence examination he must make a written application for permission to repeat the examination showing that he has improved his preparation through completion of a course or through tutoring or supervised study. Application forms are available in the office of the Department of Foreign Languages and Literatures.

The competence tests are normally given three times a year: during Orientation week, on the last week of classes in May, and at the end of the Summer Session.

Those graduating in February, who have not previously passed the examination, may take it at the end of January by petition.

2. Group Requirements. *(It is expected that these requirements will normally be completed by the end of the sophomore year.)*
A student whose major is included in Groups I, II, or III shall present for the satisfaction of that group requirement some course outside of his major field. *A student may not offer in fulfillment of the Group I requirement the elementary course in the language in which he satisfies the special language requirement.*

   I. A student must successfully complete a year's work (two sequential semesters) in this group.
      a. Arts 31, 32
      b. English 13, 14, or 15, 16
      c. Humanities 1-2
      d. Languages
      e. Music 37-38
      f. Philosophy 5, 8 or 21, 22
      g. Speech and Drama 21, 24

   II. A student must successfully complete a year's work (two sequential semesters) in this group (students electing a biological science during their freshman year must elect a physical science during their sophomore year, or *vice versa*):
      a. Biological Science (Biology 1-2; Botany 1, Biology 2; or Biology 3).
      b. Physical Science (Chemistry 1-2; 3-4; or 5-6; Geology 1-2; Mathematics 5, (7); or 7-8; Physical Science 1-2; Physics 1-2.

   III. A student must successfully complete at least 6 semester credits of course work in this group.
      a. Economics
      b. Government
      c. Psychology
      d. Sociology

3. Divisional Requirements
The student must meet such divisional requirements as may be established in the division in which he is majoring.

4. Major Requirements
Each student pursuing the *General Liberal Arts* curriculum may select at the end of the second semester of the freshman year, and shall select not later than the end of the second semester of the sophomore year, a major department in which he shall pass courses to a total of 24 semester credits with grades of C or better. Courses in other departments closely related to the major courses may be counted with the consent of the major supervisor. Departments shall designate in the catalogue in their description of courses those which will not count for major credit. In addition to satisfactorily completing (1) 24 semester credits in the major field and (2) the divisional requirements, each student, at the discretion of his major department, may be required to:
      a. Pass a comprehensive examination in his major field
      or
      b. Prepare a satisfactory paper, on a subject approved by his supervisor, in the student's field of concentration.

5. Minor Option

Each student in the College of Liberal Arts may apply during his final term for a minor, to be shown on his transcript. The minor may be in any discipline in the College of Liberal Arts or any discipline in which a student may major in the General Liberal Arts Curriculum. A minor is 18 semester hours with C or better in subjects that count for major credit. No more than six credits used to satisfy major or prescribed curriculum requirements shall be used for a minor.

IV. Prescribed Curriculum Requirements

1. A student registered in a Prescribed curriculum must satisfy the General University Requirements and the General College Requirements described in previous pages.

2. *Inasmuch as all Prescribed curricula are intended to furnish professional or semi-professional preparation, students selecting them are held for the successful completion of all the courses prescribed and generally in the sequence in which they are arranged in the curriculum.*

3. A student pursuing a Prescribed curriculum must meet the quality requirements established for that curriculum. (See descriptions of the curricula on preceding pages.)

GENERAL LIBERAL ARTS CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
‖R.O.T.C. *(men)*	( )	( )
P. E. 1, 2 *(women)*	1	1
P. E. 31, 32 *(men)*	½	½
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
*A Biological Science (Biol. 1-2; Bot. 1, Biol. 2; or Biology 3) or a Physical Science *(Chem. 1-2†; Chem. 3-4; or 5-6; Geol. 1-2; Math. 5, (7); or 7-8; Ph.Sci. 1-2; or Phys. 1-2‡*	3,4,or 6	3,4,or 6
Engl. 1-2, *Freshman English*	3	3
§Electives to meet semester requirements		

---

* Students electing a Biological Science during their freshman year must elect a Physical Science during their sophomore year, or vice versa. A biological science is required in addition to another University Group B course in the General Liberal Arts Curriculum.

† Chemistry 1-2 does not fulfill the requirement for pre-medical students or Biology majors nor the prerequisite for further courses in Chemistry.

‡ Students who expect to major in Physics should not register for Physics 1-2, but should elect Mathematics 21-22 and Physics 18 to be able to schedule Mathematics 23-24 and Physics 23-24 in the sophomore year. (See description of Physics major, page 78.)

§ See Special Language Requirement, page 93.

‖All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 93.

Sophomore Year

||R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, *(women)*	1	1
Elect one year's work from each of the three following groups (see group requirements, page 94):		
Group B and II	3,4,or 6	3,4,or 6
Group C and III	3	3
Group D and I	3	3
Electives to meet semester requirements		

Junior Year

Major courses and electives to meet semester requirements

Senior Year

Major courses and electives to meet semester requirements

MEDICAL TECHNOLOGY CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. (*men*)	( )	( )
P. E. 31, 32 *(men)*	½	½
P. E. 1, 2 *(women)*	1	1
Biol. 1-2, or 3, *Man and the Living World*	3	3
Chem. 3- 4, *General Chemistry*	4	4
English 1-2, *Freshman English*	3	3
Math. 7-8, *Fundamental Mathematics*	3	3
Electives		

Sophomore Year

||R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, *(women)*	1	1
Microb. 1, *General Microbiology*	4	
Microb. 8, *Pathogenic Microbiology*		4
Chem. 17, *Introductory Quantitative Analysis*	4	
Chem. (45), *Organic Chemistry*		5
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Elective from Group D and I	3	3
Electives		

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 82.

Junior Year

Bio. Ch. 56, *Physiological Chemistry*		5
Microb. 53, *Immunology and Serology*	4	
Zool. 17-18, *Mammalian Anatomy and Systematic Physiology*	4	
Elective from Group C and III	3	3
Electives		

Senior Year

*Biol. 61-62, *Clinical Laboratory Methods*	16	16

NURSING CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
‖R.O.T.C. (*men*)	( )	( )
P. E. 1, 2 (*women*)	1	1
P. E. 31, 32, (*men*)	½	½
Biol. 1-2, *Men and the Living World*	3	3
English 1-2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Chem. 3-4, *General Chemistry*	4	4
Elective		

Sophomore Year

‖R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, *(women)*	1	1
Zool. 17-18, *Mammalian Anatomy and Systemic Physiology*	4	4
Elective from Group D and I	3	3

Junior Year

Bio. Ch. 1, *Organic and Biological Chemistry*	5	
Zool. 66, *Elements of Histology and Microtechnique*		4
Elective from Group C and III	3	3
Electives		

Training Period

Credit earned in training at an approved hospital will apply toward a Bachelor's degree. The University should be informed of the training school affiliation. A transcript of the hospital record must be submitted upon completion of the training program. An application for a degree must be filed.

---

* This course starts about June 20 at the Mary Hitchcock Memorial Hospital School of Medical Technology and includes lecture and laboratory work in microbiology, blood bank and serology, clinical chemistry, hematology, laboratory management and ethics, mycology, parasitology, histology, and clinical microscopy. The credits are awarded in time for graduation in June of the following year after receipt of an official transcript of the grades obtained at the School of Medical Technology and certification by the director of this school and the supervisor of the curriculum that the work has been successfully completed.

‖All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 83.

OCCUPATIONAL THERAPY CURRICULUM

1963-1964

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. (*men*)	( )	( )
P. E. 1, 2 (*women*)	1	1
Biol. 1-2, *Man and the Living World*	3	3
English 1-2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Arts 23, 24, *Basic Design, Drawing and Design*	2	2
Psych. (1), *General Psychology*		3
Soc. 1, *Introduction to Sociology*	3	
Sophomore Year		
||R.O.T.C. (*men*)	( )	( )
P. E. (3), (4), *(women) (Ele. Games; Rec. Workshop)*	1	1
Home Ec. 25, *Child Development*	3	
O. T. 41, *Application, Scope and Area of O. T.*	2	
O. T. (1), *Therapeutic Crafts*		3
Psych. (47), *Mental Hygiene*		3
Zool. 17-18, *Mammalian Anatomy and Physiology*	4	4
Elective from Group D and I	3	3
Elective from Group C and III	3	3
Junior Year		
O. T. (2), *Therapeutic Crafts*	3	3
O. T. 42, *Application of O. T. in General Medicine*		2
O. T. 49, *Medical Lectures, Gen. Medicine, Surgery*	3	
O. T. 50, *Medical Lectures, Orthopedics*		2
Psych. 54, *Psychopathology*		3
Zool. 19, *Kinesiology*	3	
Zool. 64, *Neurology*		4
O. T. Group A, *Skills and Techniques*	6	
O. T. Group B, *Skills and Techniques*		3
Senior Year		
O. T. Group A	6	
O. T. (44), *Application of O. T. in Psychiatry*		2
O. T. (46), *Application of O.T. in Physical Disabilities*	2	
O. T. 51, *Medical Lectures, Psychiatry*	2	
*O. T. 56, *Seminar Adv. Read. Indep. Study*		3
Ed. (57), *Principles of Learning*		3
Elective		

1 OT Group A — required crafts as follows: Arts 47, Woodworking, 3 cr. Arts 15, Ceramics, 3 cr.; Arts 6, Weaving, 3 cr.; and Home Ec. 5, Sewing. 3 cr.

2 OT Group B — 3 cr. elected from: Arts 16. Ceramics; Arts 48, Woodworking; Arts 45. Jewelry; or Arts 31, Photograpny.

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 83.

PRE-MEDICAL CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. (*men*)	( )	( )
P. E. 1, 2, *(men)*	½	½
P. E. 31, 32, *(women)*	1	1
Chem. 3-4, *General Chemistry*	4	4
English 1-2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Math. 7-8, *Fundamental Mathematics* (or Math. 5-7, if appropriate)	3	3
Sophomore Year		
||R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, (*women*)	1	1
Biol. 1-2, *Man and the Living World*	3	3
Chem. (21), *Semimicro Qualitative Analysis*		4
*Language (French or German)	3 or 5	3 or 5
Phys. 1-2, *Introductory Physics*	4	4
Zool. 4		2
‡Social Science	3	
†Elective		
Junior Year		
Chem. 51-52, *Organic Chemistry*	5	5
*Language	3	3
‡Social Science	3	3
Zool. 17-18, *Mammalian Anatomy and Systemic Physiology*	4	4
†Elective		
Senior Year		
Group D and I	3	3
‡Social Science (Group C and III)	3 or	3
†Elective		

* Either French or German. If the student passes an entrance reading test in either French or German, one year of the same language will fulfill the language requirement. To fulfill the requirement the student must complete either French 2; 3, 4; or 5, 6; German 2; 3, 4; or 5, 6.

† No more than 24 semester hours of Biology (including Botany, Microbiology, Entomology, and Zoology). Chemistry and Physics in addition to the required courses may be taken as elective.

‡ The student must complete 12 semester hours selected from courses in the following departments: Economics, Government, History (other than History 1, 2), Psychology, Sociology. Courses from at least three of the five departments must be presented.

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 85.

SOCIAL SERVICE CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. (*men*)	( )	( )
P. E. 1, 2, *(men)*	½	½
P. E. 31, 32, *(women)*	1	1
*Biol. 1-2, *Man and the Living World*	3	3
English 1-2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Soc. 1, *Introductory Sociology*	3	
Electives		
Sophomore Year		
||R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, *(women)*	1	1
Microb. 5, *Public Health and Sanitation*	3	
Psych. 1, *General Psychology*	3	
Psych. (47), *Mental Hygiene*		3
Soc. 27, *The Family*	3	
Soc. 44, *Social Psychology and* Psychology 44, *Psychology of Personality*		3
Electives from Group D and I	3	3
Electives		
Junior Year		
Soc. 71, *Criminology*	3	
Soc. 73, 74, *Introduction to Social Welfare*	3	3
*Elective from Group B and II	4	4
Electives		
Senior Year		
Psych. 54, *Psychopathology*		3
Soc. 75, 76, *Methods of Social Research*	3	3
Soc. 97, *Social Welfare Field Experience*	6	
Group C	3, 4	3, 4
Electives		

* A Group B course in addition to Biology 1-2 is required in this curriculum.

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 85.

ART EDUCATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. (*men*)	( )	( )
P. E. 1, 2, *(men)*	½	½
P. E. 31, 32, *(men)*	1	1
English 1-2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Group B	3, 4	3, 4
Arts 23, *Basic Design*	2	
Arts 24, *Drawing and Design*		2
Electives		
Sophomore Year		
||R.O.T.C. (*men*)	( )	( )
P. E. 3, 4, *(women)*	1	1
Arts 15, 16, *Ceramics*	3	3
Arts 25, 26, *Advanced Drawing and Painting*	3	3
Educ. 41, *Educational Psychology*	3	
Elective from Group C and III	3	3
Elective from Group D and I	3	3
Elective		
Junior Year		
Arts 3, *Crafts*	3	
Arts (27), *Graphic Arts*		3
Arts (28), *Advertising Design and Illustration*	3	
Arts 31, 32, *Introduction to The Arts*	3	3
Sp. (37), *Stagecraft*		3
Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
H. Ec. 31, *Interior Design*	3	
Elective		
Senior Year		
Arts 29, *Advanced Painting and Composition*	3	
Art-Ed. 91, *Problems of Teaching Art in Elementary Schools*	3	
Art-Ed. (92), *Problems of Teaching Art in Secondary Schools*	3	
Ed. 59, *Principles of Education*	3	
Ed.-Art 94, *Supervised Teaching*		14
H. Ec. 65, *History of Costume*	3	
Elective		

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 87.

MUSIC EDUCATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
||R.O.T.C. *(men)*	( )	( )
P. E. 1, 2 *(women)*	1	1
P. E. 1, 2, *(men)*	½	½
English 1-2, *Freshmen English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Group B	3, 4	3, 4
*Applied Music	2	2
†Mus. 9-10, *Sightsinging. Ear Training, Dictation I*	0	0
Music Laboratory	1	1
‡Recitals		
Electives		

Sophomore Year		
R.O.T.C. *(men)*	( )	( )
P. E. 3, 4, *(women)*	1	1
*Applied Music	2	2
Educ. 41, *Educational Psychology*		
§Mus. 11-21, *Harmony I*	2	2
Mus. 13-14, *Sightsinging, Ear Training, Dictation II*	1	1
||Mus. 37-38, *Introduction to Music Literature*	3	3
Mus. 41-42, *Principles of Conducting*	1	1
Music Laboratory	1	1
Elective from Group C and III	3	3
Elective		
‡Recitals		

Junior Year		
*Applied Music	2	2
Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
Elective from Group D and I	3	3
Mus. 15-16, *Harmony II*	2	2
Mus. 97-98, *Orchestration and Chorestration*	2	2
Music Laboratory	1	1
Mu.-Ed. 90, *Problems in the Teaching of Elementary School Music*		3
Mu.-Ed. 97, *Techniques and Methods in Brass and Percussion Instruments*	3	
‡Recitals		

* For explanation of footnotes, see next page.

Senior Year	*First Semester Credits*	*Second Semester Credits*
*Applied Music	2	
Ed. 59, *Principles of Education*	3	
Mu.Ed. 93, *Problems in the Teaching of Secondary School Music*	3	
Mu.-Ed. 95, *Techniques and Methods in String Instruments*	2	
Mu.-Ed. (96), *Techniques and Methods in Woodwind Instruments*	3	
Music Laboratory	1	
Ed.-Mu. (93), *Supervised Teaching of Elementary School Music*		7
Ed.-Mu. 94, *Supervised Teaching of Secondary School Music*		7
Electives		
‡Recitals		

* A minimum of 16 semester credits in Applied Music must be offered by students in this curriculum.

† Qualified students are exempted from this requirement upon proper notification to the College Dean's office and the University Registrar.

‡ Recitals — Students enrolled in this curriculum must accumulate a minimum of 24 points in the sophomore, junior, and senior years. Attendance at each concert or recital constitutes one point.

§ Although Mus. 9-10 is normally a prerequisite to 11-12, the latter may be taken in the freshman year concurrently with Music 9-10, provided that the student is familiar with the keyboard and can read simple pianoforte music.

|| This course may be taken during the freshman year.

||All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 88.

PHYSICAL EDUCATION
TEACHER PREPARATION CURRICULUM FOR MEN

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32,	½	½
Biol. 1-2, *Man and the Living World*	3	3
Engl. 1, 2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
‖R.O.T.C.	( )	( )
Basic course in second teaching major	3	3
Sophomore Year		
‖R.O.T.C.	( )	( )
Educ. 41, *Educational Psychology*	3	
P. E. (23), *Principles of Physical Education*		3
Second teaching major; Second year	3	3
Zool., *Mammalian Anatomy and Physiology*	4	4
Group C and III	3	3
Group D and I	3	3
Junior Year		
Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
P. E. (61), *Problems of Teaching in Physical Education*		3
*Problems of coaching, *P. E. 47, (48)*	4	
*Problems of coaching, *P. E. (45), 46*		4
Second teaching major	3	3
Ed. 59, *Principles of Education*		3
Elective, *first teaching minor*		
Senior Year		
Ed.-P. E. 93, *Directed Teaching in Physical Education*	3	
P. E. 65, *Administration of Physical Education in Secondary Schools*	3	
*Problems of coaching, *P. E.* 47, (48)	4	
Problems of teaching, *Second teaching major, i.e., Engl.- Ed. 91, etc.*	3	
†Second teaching major	3	
Supervised teaching in major or majors, *i.e., Ed.-Engl. 94, etc.*		14

---

* Four problems of coaching courses are required.

† Students must select for a second teaching major one of the subjects for which Educ. 91 courses are offered. It is important that students acquaint themselves with the prerequisites of the Educ. 91 course in the subject matter of their second teaching major.

‖All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

Detailed Description of this Curriculum Appears on Page 88.

PHYSICAL EDUCATION

TEACHER PREPARATION CURRICULUM FOR WOMEN (PHYSICAL EDUCATION OPTION)

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 1, 2, (See required activities, page 89)	1	1
Biol. 1-2, *Man and the Living World*	3	3
Engl. 1, 2, *Freshman English*	3	3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Electives		
Sophomore Year		
P. E. 3, 4, *Physical Education*	1	1
P. E. 13, 14, *Physical Education*	1	1
P. E. 23, *Principles of Physical Education*	3	
P. E. (36), *Recreation Leadership*	3	
Educ. (41), *Educational Psychology*		3
Educ. (41), *Educational Psychology*		3
Zool. 17-18, *Mammalian Anatomy and Physiology*	4	4
Elective from Group D and I	3	3
Elective		
Junior Year		
P. E. 5, 6, *Physical Education*	1	1
Educ. 57, *Principles of Learning*	3	
Educ. 59, *Principles of Education*		3
P. E. 53, 54, *The Theory of Teaching Dance*	2	2
P. E. 56, *Health Education*		3
P. E. 63, 64, *The Theory of Teaching Team Sports*	2	2
Zool. 19, *Kinesiology*	3	
Elective from Group C and III	3	3
Elective		
Senior Year		
Ed.-P. E. 92, *Directed Teaching of Physical Education for Women*		6
P. E. 55, *Remedial Gymnastics*	3	
P. E. (66), *Administration of Physical Education*	3	
P. E. 68, *Measurement Procedures in Physical Education*	2	
P. E. 73, 74, *The Theory of Teaching Individual Sports for Women*	2	2
P. E.-Ed. 91, *Problems in the Teaching of Physical Education for Women*	3	
Electives other than Physical Education	3	3

† Students desiring to teach in areas in addition to Physical Education should plan to take Educ. 58. They should also elect 18 semester hours in a second teaching field.

Detailed Description of this Curriculum Appears on Page 89.

RECREATION EDUCATION OPTION

Freshman Year	*First Semester Credits*	*Second Semester Credits*
Same as for Physical Education Option		

Sophomore Year

Same as for Physical Education Option

Junior Year

Recreation Education Option*

P. E. 5, 6	1	1
Sp. 37, *Stagecraft*	3	
Arts 4, *Crafts*		2
Educ. 57, *Principles of Learning*	3	
For. 38, *Nature Education*		3
P. E. 24, *Organized Camping*		3
P. E. 53, 54, *The Theory of Teaching Dance*	2	2
P. E. 73, 74, *The Theory of Teaching Individual Sports for Women*	2	2
Soc. 1, 18, *Introductory Sociology; Social Problems*	3	3
Elective		

Senior Year

Recreation Education Option*

Sp. 62, *Directing*		3
†Music 37, *Introduction to Music Literature*	3	
P. E. (66), *Administration of Physical Education*	3	
P. E. 96, *Recreation Field Work*		6
P. E.-Ed. 91, *Problems in the Teaching of Physical Education for Women*	3	
Soc. 44, *Social Psychology*		3
‡Elective from Group D and I	3	3
Elective from Group C and III	3	3
Elective		

* In addition to the requirements listed above, each student is required to secure before graduation a minimum of 8 points of community recreation or camping credits. (See page 89.)

† If Music has already been taken in the sophomore year, 3 additional hours in Group D must be taken in the senior year.

‡ This senior requirement may be fulfilled by any two semester courses from the sophomore Group D listing; they need not be sequential.

Detailed Description of this Curriculum Appears on Page 89.

The College of Technology

Robert N. Faiman, *Dean*

John B. Hraba, *Associate Dean*

Chemical Engineering | Electrical Engineering
Civil Engineering | Mechanical Engineering
Chemistry | Mathematics | Physics

GENERAL INFORMATION

The College of Technology is organized to offer its students a vigorous professional education in engineering, the physical sciences, or mathematics. All programs require study in the humanistic-social area in addition to a thorough grounding in the basic aspects of mathematics and the physical sciences and the specialized studies of the chosen professional area. This pattern of undergraduate work is designed to provide a base either for a successful career in industry or for advanced study at the graduate level. Since modern technology is drawing engineering applications and their scientific bases more closely together, the engineering curricula are oriented to emphasize the theoretical-scientific aspects of engineering with a corollary deemphasis of its more applied phases. The importance of the role and responsibility of the engineer or scientist in modern society is emphasized through study in the humanistic-social areas.

REQUIREMENTS FOR DEGREES

The College of Technology offers the following baccalaureate degrees: Bachelor of Science in Chemical Engineering, Bachelor of Science in Chemistry, Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering, Bachelor of Science in Mathematics, Bachelor of Science in Mechanical Engineering, and Bachelor of Science in Physics. Each candidate for a degree must satisfy all general University requirements for graduation, complete at least 144 semester credits, including the courses required in one of the four-year curricula described below, and achieve a minimum grade-point average of 2. For information concerning advanced degrees, see the Graduate School catalogue.

CURRICULA

Curricula of the various departments in the College of Technology are revised and modified as required to reflect the patterns of their professional areas and to provide an effective base for the future professional growth of their graduates. Entering students may anticipate that a curricular program as presented, or as subsequently modified, will permit their graduation in four years, assuming normal loads and progress. If a break in attendance occurs, or other than normal progress is made, the curricular requirements and objectives which must ordinarily be satisfied will be those which are

in effect at the time of graduation. Specific programs accomplishing this will be prepared by the student and his adviser for approval by the Executive Committee of the College.

The following four-year curricula are offered:

Chemical Engineering

Chemical Engineering is that branch of engineering which involves the application of chemistry, physics, mathematics, and fundamental engineering principles to the design, construction, and operation of equipment for carrying out chemical processes on an industrial scale at the lowest possible cost. The Chemical Engineering curriculum, therefore, provides the student basic training in the physical sciences, engineering principles, and economics. Although chemical engineering is a distinct profession, chemical engineers are also considered to be members of the chemical profession and a considerable portion of the Chemical Engineering curriculum is devoted to the science of chemistry. However, emphasis is placed upon the large-scale manufacture of chemical products instead of the laboratory phases of chemistry.

Chemistry

This curriculum is intended to prepare the student for the career of a professional chemist in industry and to give a good foundation for graduate study leading to original and independent research.

Instruction is given by lectures, recitations, and carefully supervised laboratory work. The laboratory study is largely individual and the course work of each student is planned to furnish a broad knowledge of chemical science. The student may elect either German or French to enable him to read chemical literature, and he receives a grounding in mathematics and physics necessary for the advanced courses in chemistry. In the senior year, an independent research project is undertaken, permitting the student to use the reference library and chemical periodicals throughout the course of a laboratory investigation.

Civil Engineering

The profession of Civil Engineering, the oldest of the major branches of engineering practice, embraces the functions of planning, design, and construction of buildings, bridges, dams, transportation projects, and public works in general.

The curriculum includes a study of those basic sciences which are essential to the practice of Civil Engineering, and the application of those principles in the classroom, design room, and laboratory. Additional work is provided in the social-humanistic fields to produce a graduate who is technically competent and well adjusted to his social environment.

Electrical Engineering

This curriculum provides instruction intended to prepare the student for graduate study or to begin his career in professional electrical engineering. In the first two years the student concentrates on mathematics and basic sciences which provide essential preparation for the engineering science, analysis, and design courses of the last two years. Since the emphasis is on fundamentals, the curriculum does not provide for specialized training in any particular sub-branch of electrical engineering. In the junior and senior years, however, the student is provided an opportunity to elect courses in particular areas of interest.

Mathematics

The Technology curriculum in Mathematics consists of a thorough grounding in calculus, followed by advanced work in algebra, analysis, applied mathematics, and geometry. Such a program meets the requirements currently set by graduate schools for admission to graduate study in mathematics. It also furnishes the basic mathematical training required of mathematicians in industry and government. Modern science continues to increase its demands on the undergraduate mathematics program and the Technology Mathematics curriculum is subject to continual scrutiny and revision in an effort to keep up with these demands. Every effort is made to give the student of mathematics the most up-to-date possible presentation of the basic subject matter in this field.

Mechanical Engineering

The Mechanical Engineering curriculum is intended to prepare young men and women either for graduate study or to enter the field of professional mechanical engineering. The curriculum provides a firm foundation in the basic physical sciences and the engineering sciences, augmented by a coordinated sequence of social-humanistic courses. Training is provided in the organization and utilization of principles, personnel, and physical resources for the solution of mechanical engineering problems.

Physics

The Technology curriculum in Physics is intended to offer basic training in fundamentals, supplemented by laboratory work, in the various branches of physics. Opportunity is given in the senior year for experimental investigation in some of the fields of physics under guidance of staff members. Such a curriculum prepares its graduates for basic research in industry, the various government research organizations, or for continued academic study toward advanced degrees.

Agricultural Engineering

Agricultural Engineering is offered in the College of Agriculture (see page 55). Basic science and some engineering courses in the curriculum of Agricultural Engineering are given by the College of Technology.

HONORS PROGRAM

The College of Technology, through its various departments, offers the superior student the opportunity to participate in an Honors Program which is individually designed to provide added intellectual incentives and opportunities beyond those offered in the regular curricula. Admission to Honors status is by invitation of the department concerned and with the approval of the Dean of the College. It is limited to those students entering the junior year with at least a 3.0 average.

The program permits the student, with approval of his departmental adviser and the Dean, to develop an individualized plan of study which, within the framework of his chosen professional area, may include appropriate courses from any of the Colleges in the University in lieu of, and/or in addition to, those courses normally prescribed.

DUAL DEGREE PROGRAMS

Students may formally combine studies in a professional curriculum in the College of Technology with studies in other curricula of the University. The College of Liberal Arts offers a broad liberal educational experience in a number of major areas or specific curricula in the Whittemore School or the College of Agriculture may be jointly pursued as the basis of preparation for an interdisciplinary career. Normally these joint programs will involve attendance for five years and two Bachelor's degrees will be awarded upon satisfactory completion of the requirements of both areas. If a student is approved for a dual degree program, initial registration will be in the College of Technology, but an adviser will be assigned from both areas so that an integrated program of study may be planned from the outset in order to accomplish the student's objectives in the most efficient and academically-sound manner.

CHEMICAL ENGINEERING

Freshman Year	First Semester Credits	Second Semester Credits
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Humanistic-Social Elective	3	
	16½	17½
Sophomore Year		
*R.O.T.C.	( )	( )
Chem. 47-48, *Organic Chemistry*	5	5
Ch. E. 42, *Chemical Engineering Principles I*		3
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
Phys. 23-24, *General Physics II and III*	4	4
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
	17	18
Junior Year		
Chem. 83-84, *Physical Chemistry*	5	5
Ch. E. 51-52, *Chemical Engineering Principles II and III*	4	4
Ch. E. 54, *Chemical Engineering Principles IV*		4
E. E. 33, *Fundamentals of Electrical Engineering*	4	
M. E. 25, *Statics*	2	
M. E. 35, *Strength of Materials*		3
§Humanistic-Social Elective	3	3
	18	19
Senior Year		
Ch. E. 63, *Chemical Engineering Principles V*	4	
Ch. E. 66, *Chemical Engineering Economics and Plant Design*		4
Ch. E. 67, *Chemical Engineering Thermodynamics*	3	
Ch. E. 68, *Physical Metallurgy*	4	
Ch. E. 69, *Chemical Engineering Project* or *Approved Elective*		3
§Humanistic-Social Elective	3	3
Approved Technical Elective	3	6
	17	16

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ To be chosen from University Group Requirements C and D. See page 42.

TECHNOLOGY CURRICULUM IN CHEMISTRY

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 5-6, *General Chemistry and Qualitative Analysis*	6	6
Engl. 1-2, *Freshman English*	3	3
M. E. 13, *Engineering Drawing*, or Elective	1	
†Math. 21-22, *Calculus B1 and B2, or* Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
	15½	18½

Sophomore Year

*R.O.T.C.	( )	( )
Chem. 47-48, *Organic Chemistry*	5	5
‡Math. 23, *Calculus B3*	5	
Math. 24, *Differential Equations*, or Elective		3
Phys. 23-24, *General Physics II and III*	4	4
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
	17	15

Junior Year

Chem. 61-62, *Analytical Chemistry*	5	5
Chem. 83-84, *Physical Chemistry*	5	5
Chem. (55), *Organic Chemistry*		3
Ger. 1, *Elementary German*	5	
Elective		3
§Humanistic-Social Elective	3	3
	18	19

Senior Year

Chem. (56), *Organic Chemistry*	3	
Chem. 85, *Inorganic Chemistry*	3	
Chem. 86, *Physical Chemistry*		3
Chem. 87, 88, *Chemical Literature and Seminar*	1	1
Chem. 89-90, *Thesis*	6	6
Elective	3	3
§Humanistic-Social Elective	3	3
	19	16

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 25-26 sequence will substitute a technical elective here.

§ To be chosen from University Group Requirements C and D. See page 42.

CIVIL ENGINEERING

Freshman Year	First Semester Credits	Second Semester Credits
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Humanistic-Social Elective	3	
	16½	17½

Sophomore Year		
*R.O.T.C.	( )	( )
C. E. 1, *Surveying I*	3	
C. E. 2, *Surveying II*		3
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
Phys. 23-24, *General Physics II and III*	4	4
M. E. 25, *Mechanics, Statics*	2	
M. E. (35), *Strength of Materials*		3
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
	17	16

Junior Year		
C. E. 17, *Engineering Materials*	3	
C. E. 25, *Theory of Structures I*	4	
C. E. 50, *Transportation Engineering*		3
C. E. 52, *Fluid Mechanics*		3
C. E. (53), *Fluid Mechanics Laboratory*		1
C. E. 56, *Steel Design*		3
E. E. 33, *Electrical Engineering Fundamentals*	4	
Geol. 7, *General Geology* (or Geol. 1)	2	
M. E. (26), *Mechanics, Dynamics*	3	
M. E. (33), *Thermodynamics*		3
Engl. (23), *Writing of Technical Reports*		2
§Humanistic-Social Elective	3	3
	19	18

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ To be chosen from University Group Requirements C and D. See page 42.

Senior Year

Approved C. E. Elective	3	3
C. E. (54), *Soil Mechanics and Foundations*	4	
C. E. 57, *Theory of Structures II*	4	
C. E. 59, *Reinforced Concrete Design*	3	
C. E. 63, *Water Supply and Treatment*	3	
C. E. 64, *Sewerage and Sewage Treatment*		4
§Humanistic-Social Elective		3
Approved Technical Electives		8
	17	18

§ To be chosen from University Group Requirements C and D. See page 42.

ELECTRICAL ENGINEERING

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Humanistic-Social Elective	3	
	16½	17½

Sophomore Year		
*R.O.T.C.	( )	( )
E. E. 1-2, *Electrical Engineering*	3	4
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
M. E. 25-26, *Statics, Dynamics*	2	3
Physics 23-24, *General Physics II and III*	4	4
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
	17	17

Junior Year		
E.E. 3-4, *Applied Electromagnetics*	3	3
E. E. 5, *Electric Circuits*	3	
E. E. 9-10, *Physical Electronics and Linear Active Circuits*	3	3
E. E. 14, *Electronics Laboratory*		1
E. E. 15-16, *Student Branch I.E.E.E.*	0	0
E. E. 23, 24, *Electrical Laboratory*	2	2
M. E. (35), *Strength of Materials*		3
M. E. 33, 36, *Thermodynamics, Fluid Mechanics*	3	3
M. E. 37, *Mechanical Laboratory*	1	
‖Humanistic-Social Elective		3
§Approved Elective	3	
	18	18

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ Electives are selected with the advice and consent of the adviser.

‖ To be chosen from University Group Requirements C and D. See page 42.

Senior Year

English (23), *Writing of Technical Reports*		2
E. E. 17, 18, *Student Branch I.E.E.E.*	0	0
E. E. 25, 26, *Electrical Laboratory*	2	2
E. E. 45, 46, *Electrical Networks, Fields*	3	3
M. E. (34), *Thermodynamics*	3	
M. E. 65, *Engineering Economy*	3	
‖Humanistic-Social Elective	3	3
§Approved Elective	4	7
	18	17

§ Electives are selected with the advice and consent of the adviser.
‖ To be chosen from University Group Requirements C and D. See page 42.

TECHNOLOGY CURRICULUM IN MATHEMATICS

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Engl. 1-2, *Freshman English*	3	3
Chem. 3-4, *General Chemistry*	4	4
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
French 1	5	
	17½	16½

Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23-24, *Calculus B3 and Differential Equations*, or Math. 24, 27, *Differential Equations and Multi-Dimensional Calculus*	5 3	3 5
Math. 31, *Set Theory*	4	
Math. 41, *Probability*		3
Phys. 23-24, *General Physics II and III*	4	4
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
§Humanistic-Social Elective	3	3
	19 or 17	16 or 18

Junior Year		
Math. 51, *Methods of Applied Math. I*	4	
Math. 55, *Fundamental Concepts of Geometry*		4
Math. 61-62, *Higher Algebra I and II*	4	4
Ger. 1-2, *Elementary German*	5	5
Elective	4	4
	17	17

Senior Year		
Math. 84, *Topology*	4	
Math. 88, *Complex Analysis*		4
Math. 97, *Senior Seminar*		3
Math. 67-68, *Real Analysis I and II*	4	4
§Humanistic-Social Elective	3	3
Non-Technical Elective	3	3
Elective	4	
	18	17

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ To be chosen from University Group Requirements C and D. See page 42.

MECHANICAL ENGINEERING

Freshman Year	First Semester Credits	Second Semester Credits
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2 or* Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Humanistic-Social Elective	3	
	16½	17½
Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23-24, *Calculus B3 and Differential Equations,* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
M. E. 17, *Manufacturing Processes and Design*	3	
M. E. 22, *Materials*		3
M. E. 25, *Statics*	2	
M. E. 26, *Dynamics*		3
Phys. 23-24, *General Physics II and III*	4	4
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
	17	16
Junior Year		
E. E. 39-40, *Electrical Engineering*	4	4
M. E. 33, 34, *Thermodynamics*	3	3
M. E. 35. *Strength of Materials*	3	
M. E. 36, *Fluid Mechanics*		3
M. E. 37, 38, *Mechanical Laboratory*	1	2
||Humanistic-Social Elective	3	3
§Technical Elective	3	3
	17	18
Senior Year		
E. E. 41, *Electrical Engineering*	3	
M. E. 63, *Engineering Materials*	3	
M. E. 41-42, *Mechanical Engineering Seminar*	1	1
M. E. 43-44, *Machine Design and Analysis*	3	3
M. E. 57-58, *Heat and Power Systems*	4	4
M. E. (65), *Engineering Economy*		3
||Humanistic-Social Elective	3	3
§Technical Elective	3	3
	20	17

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ Technical Elective courses must be approved by the Department.

|| To be chosen from University Group Requirements C and D. See page 42.

TECHNOLOGY CURRICULUM IN PHYSICS

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Engl. 1-2, *Freshman English*	3	3
Chem. 3-4, *General Chemistry*	4	4
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
Non-Technical Elective	3	
	15½	16½
Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23, *Calculus B3* or Math. 27, *Multi-dimensional Calculus*	5	
‡Math. 24, *Differential Equations*		3
Phys. 23-24, *General Physics II and III*	4	4
Ger. 1, *German*	5	
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
§Elective		5
	17	15
Junior Year		
Math. 51-52, *Advanced Calculus*	3	3
Phys. 31-32, *Physical Mechanics*	4	4
Phys. 35-36, *Experimental Physics I and II*	3	2
Phys. 83-84, *Electricity and Magnetism*	4	4
||Humanistic-Social Elective	3	3
§Electives	3	3
	20	19
Senior Year		
Phys. 91-92, *Atomic and Nuclear Physics*	4	4
Phys. 95-96, *Experimental Physics III and IV*	4	4
§Electives	6	6
||Humanistic-Social Elective	3	3
Phys. 97, 98, *Colloquium*	1	1
	18	18

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 25-26 sequence may enroll in Math. 24 in either semester and will substitute a technical elective for Math. 23.

§ Non-technical electives should be chosen to total including Group Requirements not less than 24 credits. Technical electives — Phys. 81, M.E. 33, 34. Those interested in experimental physics are advised to elect a sequence of electronic courses in E.E. Seniors intending to proceed to graduate study might elect Phys. 105, 106, or 112.

|| To be chosen from University Group Requirements C and D. See page 42.

The Whittemore School of Business and Economics

Robert F. Barlow, *Dean*

Accounting — Economics
Business Administration — Secretarial Curriculum
Hotel Administration

GENERAL INFORMATION

The Whittemore School of Business and Economics, formerly a department in the College of Liberal Arts, was established as the fourth undergraduate degree-granting college at the University of New Hampshire on July 1, 1962.

The basic purpose of the School is to provide for its students a broad academic background, with professional training in one of the disciplines of accounting, business administration, economics, hotel administration, or the secretarial curriculum. Students will be required to take a substantial part of their course work in the other colleges of the University. In no sense should the basic purpose of the School be interpreted narrowly. Although upon graduation a student will have a certain degree of professional competence in the area in which he chooses to concentrate, he will shortly discover that from the point of view of his future development substantial familiarity with a myriad of other academic disciplines is necessary. In particular, students will be encouraged to elect courses in the social sciences, mathematics, the natural sciences, and the humanities. The student who pursues study in the relatively broad curricula of business administration and economics will also find that he is prepared for advanced study at the graduate level in these and related disciplines.

REQUIREMENTS FOR DEGREES

The Whittemore School offers the degrees of Bachelor of Arts and Bachelor of Science. Students concentrating in economics will be candidates for the Bachelor of Arts degree, and students concentrating in the other curricula offered by the School will be candidates for the degree of Bachelor of Science. Each candidate for a degree must satisfy all general University requirements for graduation, earn at least 128 semester credits, including the courses required in one of the four-year curricula described below, and achieve a minimum grade-point average of 2.0. The specific University, School, and curriculum requirements which must be satisfied for the degree are those in force at the time of his admission to the School either as a beginning student or as a transfer. A student may petition to satisfy the University, School, or curriculum requirements that may be in force at any time during his residence. Such a student shall be responsible, however, for *all* the academic requirements of the catalogue under which he seeks a

degree and not a portion thereof. *The new catalogue becomes effective on July 1 of each year.* For information concerning advanced degrees see the Graduate School catalogue.

INDEPENDENT STUDY

A senior in the Whittemore School of Business and Economics may register for from 6 to 12 semester credits of independent study, provided: (a) his cumulative academic average is 3.0 or better, and (b) he has submitted a plan for independent study that has been approved by his adviser. The student accepted for independent study is designated a "Whittemore Scholar". A Whittemore Scholar must meet all general School requirements. He may, at the discretion of his adviser, submit independent study credits in whole or in part for required course credits in the economics curriculum or for elective credits in the accounting, business administration, hotel administration, and secretarial curricula.

The student is to be advised by a member of the faculty of his major area of concentration. It is expected that his program will normally take the form of an independent research paper, although programs calling for another form will be considered. The result of a student's activity under this plan will be judged by three members of the faculty selected by his adviser and the Dean.

THE FORD FOUNDATION SCHOLARSHIP PROGRAM

A limited number of freshmen each year are selected from those who apply for a special five-year program leading to the B.A. and M.A. degrees in economics. The program is limited to superior students who expect that their chosen vocation shall be teaching at the college level. The regular Whittemore School requirements for the Bachelor of Arts degree and the Graduate School requirements for the Master of Arts degree are basic requirements. In addition, the student is expected to attend special seminars, incorporate a minor area of study as well as a major and complete special work in mathematics, languages, reading, and writing. During the last three years of the program he will be assigned to duties as an intern in teaching economics.

Prospective freshmen with superior high school records who are interested in this program should consult the principal or counselor in their high schools or write to the Director of Admissions at the University.

MINOR PROGRAM

Each student in the Whittemore School may apply for permission to pursue a minor program of study in any discipline in which sufficient courses are offered at the University. Permission to participate in such a minor program may be granted only by the Executive Committee of the School, which shall consider the student's major area of concentration and proposed minor before granting such permission. Successful completion of such a program is recorded on a student's academic transcript.

A minor is 18 semester hours with grades of C or better. No more than 6 credits used to satisfy area of concentration requirements shall be used for a minor.

A JOINT-DEGREE PROGRAM

A student may obtain more than one undergraduate degree by completing all the curriculum, departmental, College, scholastic, and other requirements. Anyone interested in such a program of study should confer with the deans of the colleges in which he intends to earn degrees as early in his academic career as possible and, if approved for the program, should expect to work closely with faculty advisers from the colleges involved.

CURRICULA

Accounting

Students electing to concentrate in accounting will follow a program of study which devotes substantial time to the study of accounting principles. This study will include courses in cost accounting, intermediate accounting, advanced accounting, auditing and business systems, and federal taxation, among others. In general, they will be qualified upon graduation for employment as accountants with either private business firms or public accounting firms. It is also expected that they will have a knowledge of the other aspects of over-all business administration in addition to accounting, as well as a broad background in various related disciplines. A student who elects to concentrate in this program will also find that he is well qualified to do graduate work in either accounting or general business administration.

Students must obtain a cumulative academic average of 2.0 or better in the business administration and economics courses required in this curriculum as listed on page 126. Of the required courses in business administration and economics, at least 18 semester credits shall be earned at the University of New Hampshire, and at least 6 of these semester credits shall be in accounting courses.

Business Administration

Students concentrating in business administration will be required to take courses in those areas, such as accounting and statistics, with which a business man should be familiar. In addition, they will be required to obtain a knowledge of the several functional areas of business management, the economy within which the business firm functions and the cultural, social, and political environment within which the business firm exists. For students interested in marketing and distribution, in finance, or in labor and personnel administration, a list of courses in these areas is offered. Students may choose electives from these groups. In the main, however, students in the general business administration curriculum will obtain a broad knowledge of business management principles as well as of the problems confronting and the solutions available to contemporary business management.

Upon graduation students will be qualified either to continue with advanced study in economics or business or to become members of the business community. They will find that they have both the requisite skills to participate in the business management process and the broad academic background which is becoming increasingly important for business achievement.

Students in this curriculum must obtain a cumulative academic average

of 2.0 or better in the required courses in business and economics as listed in the curriculum on page 127. Of the required courses in business administration and economics, at least 18 semester credits shall be earned at the University of New Hampshire.

Economics

Students concentrating in economics will be expected to fulfill the basic requirements set down for general Liberal Arts students, such as the modern language and science requirements. In addition, within their area of concentration they will be able to take, among others, advanced courses such as national income analysis, intermediate economic theory, money and banking, international economics, business and economic statistics, and comparative economic systems. It should be borne in mind, however, that undergraduate training in economics by no means qualifies a student as a professional economist. Those students who intend to become professional economists should plan on taking a minimum of three years of graduate work in the discipline after they have obtained their Bachelor's degree. Nevertheless, undergraduate training in economics does provide an excellent background for graduate training not only in that discipline but in other related disciplines such as government and law. If a student should plan on receiving only the Bachelor's degree, he will find that his work in economics will qualify him for many positions in business and government service.

Students in this curriculum are required to complete 30 semester credits in economics with a cumulative academic average of 2.0 or better. Of these 30 semester credits, a minimum of 18 credits must be in courses in economics numbered 51 or higher. Major credit toward the 18 semester hours required in courses numbered 51 or higher will be approved in the case of transfer students only if such courses have been taken as upper division courses, i.e., in the junior or senior year. In addition, of the required courses in economics at least 18 semester credits shall be earned at the University of New Hampshire.

Hotel Administration

Students concentrating in Hotel Administration will receive basic preparation for careers in professional management and technical specialist positions in the hotel, motel, club, and food service areas. They will be candidates for a Bachelor of Science degree. To insure that graduates know both the basic skills as well as the broad field of hotel administration, each student is required to complete at least two summer practicums of on-the-job experience. Transfer students and others may satisfy part or all of this practical-experience requirement by presenting evidence of having performed similar work. Additionally, the program of study will include a substantial amount of work in general business management and other courses outside the particular area of hotel administration in order to insure the students' having as broad a professional background as possible.

Secretarial Curriculum

The Secretarial curriculum is designed to prepare the student for the type of secretarial position in which both excellence in secretarial skills and breadth of background are essential. Because such positions are available in a number of different professions and businesses, the requirement of 18 credits in another discipline (the minor) is established in order to en-

courage the student to follow an interest which, in combination with the secretarial skills and knowledge, may be expected to lead to satisfying employment in the field of the minor. For example, a student interested in obtaining employment with a government agency would probably select courses in government for the minor. Office experience for a minimum of ten weeks in the summer between the junior and senior years will be required for graduation. The work must be done in a business or professional office approved by the supervisor of the curriculum. It is expected that remuneration for the work will be at the current rate for the kind of work done.

The Secretarial curriculum is outlined in detail on page 132. Students in the curriculum must earn grades of C or better in the following secretarial courses: 3-4 (Advanced Shorthand), 9-10 (Advanced Typewriting), 11 (Filing), 13 (Office Machines), and 17 (Office Procedures), a total of 17 credits. In addition, students in this curriculum must earn a C grade or better in 9 credits of work from the following group: Secretarial 22 (Advanced Transcription), Secretarial 23-24 (Business Writing), Economics 1-2 (Principles of Economics), Business Administration 1-2 (Principles of Accounting), Business Administration 21 (Commercial Law), Business Administration 33 (Managerial Organization).

Students transferring from collegiate institutions and high school students with previous training in secretarial subjects are required to take the following courses: Secretarial 3-4, 9-10, 11, 13, and 17.

Transfer and high school students who have had one year of Gregg shorthand (or the equivalent of one year) in another institution and have earned a grade of 80 or better (where the passing grade is 70) will not be allowed to enroll in Secretarial 1 for credit; likewise, those students who have had one year of typewriting (or the equivalent) in another institution and have earned a grade of 80 or better (where the passing grade is 70) will not be allowed to enroll in Secretarial 7 for credit (see below).

Students who have had Secretarial 5 (Personal Use Typewriting) at the University of New Hampshire or a similar course in another collegiate institution, or one semester of typewriting in high school or preparatory school, will be required to enter Secretarial 27 instead of Secretarial 7.

The Commercial Teacher Preparation program, an option in the Secretarial curriculum, will prepare the student to teach commercial subjects in secondary schools. The student in this program will not be required to take a minor but will be expected to take Education 41 (Educational Psychology) in the sophomore year, Education 57 (Principles of Learning) and Education 58 (Principles of Teaching) in the junior year; ES-Ed. 91 (Problems of Teaching Commercial Subjects in Secondary Schools) in the first semester of the senior year, and ED-CS 94 (Supervised Teaching of High School Commercial Subjects) in the second semester of the senior year. For a detailed description of this option, see page 133.

Students interested in registering for either the Secretarial curriculum or the Commercial Teacher Preparation option should consult with Professor Doris Tyrrell.

UNIVERSITY AND SCHOOL GROUP REQUIREMENTS

Students admitted to the University for the first time in the fall of 1963-64 are required to complete six semester hours in each of the following groups. Completion of 30 or more credits in three or more areas in a given group

shall satisfy the requirements of that group and advanced placement in any one of these groups satisfies the requirement of that group.

Group A — History 1-2.

Group B — Biology 1-2 and 3, Botany 1, Chemistry 1-2, Chemistry 3-4, Geology 1-2, Mathematics 7-8, Physical Science 1-2, Physics 1-2.

Group C — Economics 1-2, Geography 1,2, Government 2, 6, and 8, Psychology 1, 37, 44, and 47, Sociology 1, 2, and 33.

Group D — Arts 31, 32, English 13, 14, English 15, 16, Humanities 1-2, Music 37-38, Foreign Languages at the 3-4 level, Philosophy (5), (8), 21-22, Speech and Drama 21 and 24.

Some of the courses in the above groups are the same as those required by the School. Therefore those courses shall be considered to fulfill both the School and University requirements. Attention is called to the fact that in order to fulfill the School requirements in Group B, with the exceptions of the hotel administration and secretarial curricula, students must take a year's work (2 sequential semesters) in both a biological science and a physical science. Students majoring in accounting, business administration or economics are strongly advised to elect Mathematics 7-8 to fulfill the School requirements in the physical sciences.

ACCOUNTING CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
R.O.T.C. *(men)*	0 or 2	0 or 3
P. E. 1, 2, *(women)*	1	1
P. E. 31, 32, *(men)*	½	½
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
Engl. 1-2, *Freshman English*	3	3
B.A. 1-2, *Principles of Accounting*	3	3
Elective from Group B	3 or 4	3 or 4
Electives		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
B. A. 3-4, *Intermediate Accounting*	3	3
Econ. 1-2, *Principles of Economics*	3	3
Econ. 31-32, *Business and Economic Statistics*	3	3
Elective from Group B	3 or 4	3 or 4
Elective from Group C	3	3
	16	16

Junior Year		
B. A. 33, *Managerial Organization*	3	
B. A. 8, *Cost Accounting*		3
B. A. 21-22, *Commercial Law*	3	3
B. A. 72, *Corporation Finance*		3
Econ. 73 or 75, *Intermediate Economic Theory* or *National Income Analysis*	3	
Elective from Business Administration or Economics	3	
Elective from Group D	3	3
Electives		
	16	16

Senior Year		
B. A. 57, *Auditing and Business Systems*	3	
B. A. 56, *Federal Taxation*		3
B. A. 74, *Business Policy*		3
Econ. 53, *Money and Banking*	3	
Elective from Business Administration or Economics	3	
Electives		
	16	16

Note: Students planning to take the examination for the Certified Public Accountant Certificate are advised to elect B.A. 55, *Advanced Accounting I*, and B.A. 60, *Advanced Accounting II*.

BUSINESS CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
R.O.T.C. *(men)*	0 or 2	0 or 3
P. E. 1, 2, *(women)*	1	1
P. E. 31, 32, *(men)*	½	½
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
Engl. 1-2, *Freshman English*	3	3
B.A. 1-2, *Principles of Accounting*	3	3
Elective from Group B	3 or 4	3 or 4
Electives		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Econ. 1-2, *Principles of Economics*	3	3
Econ. 31-32, *Business and Economic Statistics*	3	3
Elective from Group B	3 or 4	3 or 4
Elective from Group C	3	3
Electives		
	16	16

Junior Year		
B. A. 33, *Managerial Organization*	3	
B. A. 43, *Production Management*	3	
B. A. 25, *Principles of Marketing*	3	
B. A. 8, *Cost Accounting*		3
Econ. 73 or 75, *Intermediate Economic Theory* or *National Income Analysis*	3	
B. A. 72, *Corporation Finance*		3
Elective from Group D	3	3
Electives		
	16	16

Senior Year		
B. A. 21, *Commercial Law*	3	
Econ. 53, *Money and Banking*	3	
B. A. 74, *Business Policy*		3
Electives		
	16	16

ECONOMICS CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
R.O.T.C. *(men)*	0 or 2	0 or 3
P. E. 1, 2, *(women)*	1	1
P. E. 31, 32, (*men*)	½	½
Engl. 1-2, *Freshman English*	3	3
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
Elective from Group B	3 or 4	3 or 4
Electives		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Econ. 1-2, *Principles of Economics*	3	3
Econ. 31-32, *Business and Economic Statistics*	3	3
Elect one year's work from each of the two following areas:		
Group B	3 or 4	3 or 4
Group C	3	3
Electives		
	16	16

Junior Year		
Econ. 73, *Intermediate Economic Theory*	3	
Econ. 75, *National Income Analysis*	3	
Elective from Group D	3	3
Electives		
	16	16

Senior Year		
Electives from Economics in courses numbered 51 and above	6	6
Electives		
	16	16

Notes: All students are required to pass a test of general competence in one of the following languages: Classical Greek, French, German, Italian, Latin, Russian, or Spanish. The test is based on the achievement of students after completion of courses in languages at the University of New Hampshire (French 1, Spanish 1, German 1, Russian 1-2, Latin 1-2, Greek 1-2, Italian 1-2). Usually two or three years of high school work are adequate preparation for this test. This examination will consist of an oral-aural test as well as a comprehensive written examination and will test the student's ability to comprehend and read texts of moderate difficulty and answer questions based on that text.

A student may also complete his college requirement by passing one of the following courses: French 1, Spanish 1, German 1, Russian 2, Latin 2, Greek 2, Italian 2, or any language course numbered higher.

In the event a student does not pass the competence examination he must make a written application for permission to repeat the examination showing that he has improved his preparation through completion of a course or through tutoring or supervised study. Application forms are available in the office of the Department of Foreign Languages and Literatures.

The competence tests are normally given three times a year; during Orientation week, on the last week of classes in May, and at the end of the Summer Session.

Those graduating in February, who have not previously passed the examination, may take it at the end of January by petition.

A student may substitute for up to 6 credits of electives in economics either courses in Agricultural Economics numbered above 50 or courses in Business Administration numbered above 50, with the permission of the Dean.

HOTEL ADMINISTRATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
R.O.T.C. *(men)*	0 or 2	0 or 3
P. E. 1, 2, *(women)*	1	1
P. E. 31, 32, *(men)*	½	½
Engl. 1-2, *Freshman English*	3	3
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
Chem. 1-2, *General Chemistry*	4	4
H. Ad. 1, *Introduction to Hotel Management*	1	
H. Ad. 40, *Lectures on Hotel Management*		½
H. Ec. 18, *Principles of Food Selection and Preparation*		3
Psych. 1, *General Psychology*	3	
Electives		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
B. A. 1-2, *Principles of Accounting*	3	3
Econ. 1-2, *Principles of Economics*	3	3
H. Ad. 42, *Lectures on Hotel Management*		½
H. Ec. 21-22, *Quantity Foods and Purchasing*	3	3
Sp. 15, *Public Speaking*	3	
Elective from Group D	3	3
Electives		
	16-18	16

Junior Year		
Arts 20, *Drafting and Space Planning*		3
B. A. 9, *Hotel and Restaurant Accounting and Control Systems*	3	
B. A. 23, *Business Communication*	3	
H. Ad. 44, *Lectures on Hotel Management*		½
H. Ad. 55, *Hotel Operation*	3	
H. Ad. 56, *Hotel Engineering Problems*		3
M. E. 40, *Heating and Ventilating*		3
Elective from Group C	3	3
Electives		
	16	16

Senior Year

H. Ad. 46, *Lectures on Hotel Management*		½
H. Ad. 66, *Hotel Promotion and Sales*		2
H. Ad. 67, *Stewarding and Catering*	3	
H. Ad. 68, *Personnel and Labor Relations in Hotels and Restaurants*		3
H. Ec. 46, *Institutional Textiles*		3
Electives		
	16	16

PRACTICAL EXPERIENCE. To be eligible for graduation a student must have had two summer practicums or satisfy the Department that equivalent experience has been completed.

SECRETARIAL CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 1, 2, *(women)*	1	1
Engl. 1-2, *Freshman English*	3	3
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
*|| Secl. 7-8, *Beginning Typing*	2	2
Elective from Group C or Group D	3	3
Elective from Group B	3 or4	3 or 4
Electives		
	16	16

Sophomore Year		
P. E. 3, 4, *(women)*	1	1
B.A. 1-2, *Principles of Accounting*	3	3
Econ. 1-2, *Principles of Economics*	3	3
*|| Secl. 1-2, *Beginning Shorthand*	3	3
Secl. 23-24, *Business Writing*	3	3
Elective from Group C or Group D, whichever Group not taken in the Freshman year.	3	3
	16	16

Junior Year		
B. A. 21, *Commercial Law*	3	
B. A. 33, *Managerial Organization*	3	
Secl. 3-4, *Advanced Shorthand*	3	3
Secl. 9-10, *Advanced Typing*	2	2
Minor	3	3–6
Electives		
	16	16

Senior Year		
Secl. 11, *Filing*	2	
Secl. 13, *Office Machines*		2
Secl. 17, *Office Procedures*	3	
Minor	3–6	3–6
Electives		
	16	16

Office Practice. To be eligible for graduation, a student must work during the summer between the junior and senior years in a business office approved by the supervisor of the curriculum.

* A grade of C or better in Secl. 3 will be required of a student electing Secl. 9-10; and a grade of C or better in Secl. 2 will be required of a student electing Secl. 3-4.

|| A student who has had high school courses in typing or shorthand may, when consulting the supervisor of the curriculum, be placed in a more advanced course in typing or shorthand. See page 124.

SECRETARIAL CURRICULUM

(Commercial Teacher Preparation Option)

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 1, 2, *(women)*	1	1
Engl. 1-2, *Freshman English*	3	3
Hist. 1-2, *Introduction to Contemporary Civilization*	3	3
Elective from Group B	3 or 4	3 or4
*|| Secl. 7-8, *Beginning Typing*	2	2
†Elective from Group C or Group D	3	3
Electives		
	16	16

Sophomore Year			
P. E. 3, 4, *(women)*	1		1
B.A. 1-2, *Principles of Accounting*	3		3
Econ. 1-2, *Principles of Economics*	3		3
Education 41, *Educational Psychology*	3	or	(3)
*|| Secl. 1-2, *Beginning Shorthand*	3		3
Secl. 23-24, *Business Writing*	3		3
Electives			
	16		16

Junior Year		
B. A. 21, *Commercial Law*	3	
B. A. 33, *Managerial Organization*	3	
Ed. 57, *Principles of Learning*	3	
Ed. 58, *Principles of Teaching*		3
Secl. 3-4, *Advanced Shorthand*	3	3
Secl. 9-10, *Advanced Typing*	2	2
Secl. 13, *Office Machines*		2
Elective from Group C or Group D	3	3
Electives		
	17	17

† If a Group C course is elected in the freshman year, a Group D course or courses must be elected in the junior year. If the Group D requirement is met in the freshman year, the Group C requirement must be met in the junior year.

* A grade of C or better in Secl. 8 will be required of a student electing Secl. 9-10; and a grade of C or better in Secl. 2 will be required of a student selecting Secl. 3-4.

|| A student who has had high school courses in typing or shorthand may, when consulting the supervisor of the curriculum, be placed in a more advanced course in typing or shorthand. See page 124.

Senior Year

Cs.-Ed. 91, *Problems of Teaching Commercial Subjects in Secondary Schools*	3	
Ed.-Cs. 94, *Supervised Teaching in High School Commercial Subjects*		14
Secl. 11, *Filing*	2	
Secl. 17, *Office Procedures*	3	
Electives		
	16	14

OFFICE PRACTICE. To be eligible for graduation, a student must work during the summer between the junior and senior years in a business office approved by the supervisor of the curriculum.

The Graduate School

The Graduate School, which has offered instruction since 1903, has for its objective the bringing together of faculty and qualified students in a spirit of scholarship and research. The graduate student is given opportunity to specialize in some field of knowledge, and to develop a maturity of thought and attitude toward his professional field, so that both his professional and his cultural life are enhanced. The work of the Graduate School is under the general direction of the Graduate Faculty. The Dean of the Graduate School is responsible for the administration of the regulations and requirements pertaining to admission, conduct of work, the granting of advanced degrees, and other pertinent matters.

Degrees

Graduate programs are offered in the following disciplines: Agricultural Economics, Agricultural Education, Agronomy, Animal Science, Biochemistry, Botany, Chemical Engineering, Chemistry, Civil Engineering, Dairy Science, Electrical Engineering, Entomology, Forestry, Home Economics, Horticulture, Mathematics, Mechanical Engineering, Microbiology, Physics, Poultry Science, and Zoology leading to the Master of Science degree; Economics, English, Foreign Languages and Literatures, Government, History, Psychology, and Sociology leading to the Master of Arts degree; and Education leading to the Master of Education degree. Programs also are available leading to the Master of Agricultural Education degree, to the Master of Public Administration degree, and to the Master of Science for Teachers degree. Graduate programs leading to the Doctor of Philosophy degree are offered in the Departments of Botany, Chemistry, Horticulture, Microbiology, Physics, and Zoology.

Assistantships, Scholarships, and Fellowships

Graduate assistantships are available in several departments. These involve work in research, teaching, general service, or some combination thereof. Scholarships are also available which provide exemption of tuition charges. A limited number of fellowships provided by the National Defense Education Act of 1958 are available in Botany, Chemistry, and Microbiology.

Information

Detailed information about admission, requirements for degrees, courses, fellowships, scholarships, and assistantships are to be found in the Graduate School catalogue which may be obtained by writing to the Dean of the Graduate School.

Description of Courses

EXPLANATION OF ARRANGEMENT

The title of the course is given in small capital letters; the Arabic numeral designates the particular course. Odd numerals indicate courses normally offered in the first semester; even numerals indicate courses normally offered in the second semester. Arabic numerals enclosed in parentheses indicate that course is repeated in the semester following. Thus course 1 (1) is offered in the first semester and is repeated in the second semester.

Courses numbered 1-50 cannot normally be counted for graduate credit. Courses numbered 51-99 are for juniors, seniors, and graduate students. They are not open to freshmen and sophomores. Descriptions of courses over 100, which are for graduate students only, will be found in the Graduate School catalogue.

Following the title is the course description. The next section gives the following information in the order indicated: (1) prerequisites, if any; (2) the number of semester credits the course will count in the total required for graduation. Laboratory periods are usually two and one-half hours in length, recitations either 50 minutes or 80 minutes in length.

Abbreviations have been employed to indicate the number of hours of work required of students in lecture, recitation, and laboratory, and the number of credits given for satisfactory completion of each course. The abbreviations should be interpreted as follows.

Cr.	Semester hour credit
Lab.	Laboratory
Lec.	Lecture
Prereq.	Prerequisites
Rec.	Recitation

All courses (unless otherwise marked) are open to students who have passed the prerequisites.

An elective course may be given only when there is a minimum of five students registered.

If the numerals designating a course running through both semesters are connected by a hyphen, the first semester, or its equivalent, is a prerequisite to the second semester. If the numerals are separated by a comma, properly qualified students may take the second semester without having had the first.

Students must register for the number of credits or within the range of credits shown in the catalogue description of a course.

ACCOUNTING

(See Economics and Business Administration)

AGRICULTURE

A grouping of non-departmental courses

DEAN'S OFFICE, COLLEGE OF AGRICULTURE

1. INTRODUCTION TO COLLEGE. A non-departmental course offering matters not ordinarily reviewed in other courses of instruction. Attention will be given to selected student rules and regulations, scholarships, campus organizations and facilities, opportunities in agriculture as a science, and to

programs of study. Also, federal aid as related to land-grant colleges and universities will be discussed. Mr. Richards. Required of first-semester freshmen in Agriculture, Forestry, and Home Economics. 1 lec.; 1 cr.

Agricultural Education

88. Principles of Agricultural Education. The technical and professional qualifications of teachers of agriculture, county agricultural agents, and 4-H club agents. The history, philosophy, and legislation affecting these programs. Special emphasis will be placed on program planning. Mr. Annis. 3 lec.; 3 cr.

89-90. Methods of Teaching Farm Mechanics in Vocational Agriculture. The organization and presentation of farm mechanics subject matter, supervision and direction of farm mechanics projects, and the preparation and presentation of demonstrations. The first semester deals with fundamental farm mechanics skills and the second semester with farm machinery maintenance and operational techniques of instruction. Mr. Gilman. Required of majors in Teacher Preparation curriculum. 1 lab.; 1 cr.

91. Planning for Teaching. The organization of materials of instruction to meet group and individual needs. Techniques of instruction, planning for teaching, the function of consulting committees, working with youth groups, and program evaluation. This course is scheduled concurrently with Ag. Ed. 93 and 95. Mr. Annis. Prereq.: Ag. Ed. 88. 4 cr.

93. Supervised Practice. Supervised practice in the specific and related problems of agricultural education. Students will be placed in Vocational Agriculture Centers and/or County Cooperative Extension Service Centers. Mr. Annis. Prereq. Ag. Ed. 88. 11 cr.

95. Preparation for Conducting and Supervising Adult Education Programs. The techniques of adult education in terms of identifying needs, program planning, methods of teaching, supervision, and evaluation. Mr. Annis. Prereq.: Ag. Ed. 88. 3 cr.

98. Seminar in Agricultural Education. Library and reference work and the preparation of papers for various phases of agricultural education. Mr. Annis. Prereq.: Supervised Practice or 6 hours in Agricultural Education. 1 cr.

AGRICULTURAL ECONOMICS

William F. Henry, *Professor;* James R. Bowring, *Professor;* Harold C. Grinnell, *Professor;* William H. Drew, *Associate Professor;* Richard A. Andrews, *Assistant Professor*

12. Economics of Agriculture. A survey of economics as related to the agricultural industry. Includes the nature of farming costs and farm prices, the economics of marketing, the economic bases of consumer decision making, and agricultural policy. Mr. Henry. 3 lec.; 3 cr.

14. Farm Management. Principles of managing farms for maximum income, including methods of making management decisions; enterprise selection and resource combination; adjustment to prices; management of land, labor, and equipment; obtaining capital; farm planning; records and analysis of performance. The principles are applied to several kinds of

farms through examples, laboratory problems, and farm visits. Open to juniors and seniors. Mr. Andrews. 3 lec.; 1 lab.; 4 cr.

34. Economics of Consumption. The significance of consumer decisions about spending and saving to the economy. Budgeting and decision making in the major categories of consumer purchases. Factors influencing consumer choice, including prices, grades, and standards. Changing food needs and their relation to production and marketing problems. Problems of maximizing consumer satisfaction. Mr. Henry. Prereq.: Econ. 1. 3 lec.; 3 cr.

51. Agricultural Business. The organizational, legal, and financial aspects of businesses engaged in buying farm products and selling farm supplies. Farm cooperatives are covered as a special case. Agricultural marketing problems are integrated with the course content. Mr. Grinnell. 3 lec.; 3 cr.

55. Agricultural Marketing. Food processing and distribution comprise one of the world's most important industries. This course examines the marketing structure for the major food industries and the kinds of market decisions and agreements made for profit and general welfare by firms, processors, and government policy makers. Consideration is given to market development, plant location, prices, grades, and specification buying as related to the demand for food by institutional buyers, processors, and retailers. Emphasis is given to international trade in food products and the place of the surplus productive capacity of the United States in relation to world trade. Mr. Bowring. 3 lec.; 3 cr.

61. Agricultural Policy. The course is designed to give non-major students a broad understanding of the various economic problems associated with agriculture in the United States and the world. The general topics covered are: history of agricultural policy in the United States; the world food situation; the agricultural problems of underdeveloped countries; the low income — high production problems of United States agriculture; agricultural production and conservation in the United States; the goals of agricultural policy; and contemporary types of agricultural policy in the United States. Mr. Drew. 3 lec.; 3 cr.

63, 64. Seminar. Presentation and discussion of reports on economic theory and current economics topics with departmental staff. Prereq.: Junior standing. May be repeated. 1 lec.; 1 cr.

67, 68. Special Problems. Special assignments in reading and problems to satisfy students' needs. Mr. Henry, Mr. Bowring, Mr. Grinnell, Mr. Drew, and Mr. Andrews. Prereq.: special permission. 1 to 3 cr.

72. Research Methodology. The scientific method of research for advanced students. Emphasis will be placed on the meaning of logic and the scientific method and on the application of research techniques to identifying and solving problems of agriculture. Prereq.: 3 hours of statistics. Mr. Drew. 3 lec.; 3 cr.

75. Linear Programming Methods. Setting up and solving problems by the simplex and distribution methods, variations in linear programming problems, solving input-output and game theory problems, and parametric programming. Situations dealt with include least cost combinations, such as feed and gas mixing, maximum profit combinations, transportation and spatial equilibrium, and intersector flows from producer to consumer. Prereq.: Math. 7 or permission of instructor. Mr. Andrews. 3 lec.; 3 cr.

GORDON L. BYERS, *Associate Professor*; PAUL A. GILMAN, *Associate Professor of Farm Mechanics, Thompson School of Agriculture*

2. RESIDENCE PLANNING. The considerations involved in building or buying a house to fit one's needs. Problems in selecting and applying typical materials to residence construction. Mr. Byers. 1 lec.; 1 lab.; 2 cr.

18. FABRICATION TECHNOLOGY. An introductory study of the nature of metals and plastics used in agriculture which deal specifically with heating, welding, forming, and repairing. Lectures, demonstrations, and laboratory practices are provided. Mr. Gilman. 1 lec.; 2 lab.; 3 cr.

21. SOIL AND WATER CONTROL. Elementary surveying and its application to agricultural problems. The design principles, mapping, and layout of drainage, erosion control, and irrigation systems along with the presentation of construction practices for farm ponds, diversion ditches, terraces, and other mechanical methods of water control. Farmstead water systems and pumps are included. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1963-64.)

22. AGRICULTURAL POWER, Tractors, tractor engines, and electrical energy in farm work. The factors involved in the management, preventive maintenance, and repair procedures required by tractor motors and their power transmission systems. Mr. Byers. 2 lec.; 1 lab.; 3 cr.

23. AGRICULTURAL MACHINERY. The selection, care, operation, and management of conventional farm machinery and processing equipment involved in the production of farm commodities. Mr. Byers. 2 lec.; 1 lab.; 3 cr.

24. AGRICULTURAL BUILDINGS. The planning and design of agricultural structures for animals and crops. Construction practices, farmstead layout, building material selection and application, material estimates, heating systems, lighting, refrigeration, sewage disposal, ventilation, environmental controls, certain phases of crop processing, and basic concepts of architectural drafting are introduced. An agricultural building problem, related to the student's major or field of interest, serves as the base for the application of all principles presented in lecture. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1963-64.)

Note: Courses numbered 31 and above are primarily for Agricultural Engineering majors and Technology students.

31. SOIL AND WATER ENGINEERING. The hydrologic, soil, vegetal, and stream flow factors involved in the design and operation of erosion control structures, drainage systems, and irrigation systems. Mr. Byers. Prereq.: C.E. 52, or concurrently: 2 lec.; 1 lab.; 3cr.

32. FARM TRACTORS. The design and operation of farm tractors, tractor power units, chassis mechanics, tractor tests and performances. Prereq. or concurrently: M.E. 26; M.E. 33. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1963-64.)

33. FIELD MACHINERY. The design of the engineering elements of farm machinery; capacity and power requirements of farm implements. Prereq.

or concurrently: M.E. 26. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1963-64.)

34. Agricultural Structures. The functional planning and the analysis used in farm building design; problems arising from the physiological processes of animals and crops. Mr. Byers. Prereq. or concurrently. M.E. 35. 2 lec.; 1 lab.; 3 cr.

35. Electric Power and Processing. The utilization of electrical energy on farms for power, illumination, and temperature control, including the study of equipment used in crop processing water systems, materials handling, and the analysis of farmstead wiring problems. Prereq. or concurrently: E.E. 39. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1963-64.)

61, (61). Special Problems in Agricultural Engineering. Guided but independent activities in special areas of agricultural engineering by students capable of self-direction. Prereq.: senior standing. 1-3 cr.; time to be arranged.

AGRONOMY

(Soils and Crops)

Allan B. Prince, *Professor;* Ford S. Prince, *Professor Emeritus;* Leroy J. Higgins, *Associate Professor;* Nobel K. Peterson, *Associate Professor;* Gerald M. Dunn, *Associate Professor*

Crops

1. Introductory Crop Production. The production, distribution, cultural practices, improvement, and uses of field crops, such as forage, grain, and tuber crops. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

25. Seed Testing. The identification of seeds and the techniques used in official methods of sampling and analyzing agricultural seeds for purity and germination. Mrs. Sanborn, Seed Analyst. Prereq.: Bot. 1 and permission of instructor. 1 lab.; 1 cr.

26. Production of Row and Other Annual Crops. The characteristics and fundamentals of production of row and drilled crops, with emphasis on corn, potatoes, and other cereal crops. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

(51). Pasture-Hay Crops and Turf. The grasses and legumes used as hay, pasture, and silage, and the methods used in the production of high quality forage. Consideration also will be given to turf grasses and management for lawns and turfs. Mr. Higgins. Prereq.: Permission of instructor. 3 lec.; 1 lab.; 4 cr.

62. Breeding of Field Crops. Principles and methods of breeding of grasses, legumes, and cereal crops. The genetic basis of breeding will be emphasized. Laboratory will consist of genetic problems, crossing and inheritance studies in the greenhouse, and statistical analysis of experimental plot designs. Mr. Dunn. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered 1963-64.)

Soils

11. Introductory Soils. The physical, chemical, and biological properties of soils in relation to plant growth. Mr. Peterson. 3 lec.; 1 lab.; 4 cr.

14. Introductory Soil Fertility. Soils in relation to their natural fertility, productivity, and the practices and amendments employed to maintain or increase fertility. Mr. Peterson. Prereq.: Agron. 11. 3 lec.; 3 cr.

57. Physics and Chemistry of Soil. Physical and chemical properties of soils; their measurement and relation to structure; water movement; temperature; and liberation, absorption, and fixation of elements in soils. Mr. Prince. Prereq.: Bio. Ch. 1 or Chem. 17 or their equivalent. 3 lec.; 2 lab.; 5 cr. (Alternate years; not offered 1963-64.)

58. Soil Classification and Mapping. The genesis, morphology, classification, and mapping of soils. Mr. Peterson. Prereq.: Agron. 11 and Geol. 1 or 7. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered 1963-64.)

General Courses

52. A Review of Agronomy. Principles and practices in agronomic crop production, including the management of soils and the use and response of lime and fertilizers. For teachers of Vocational Agriculture and other students with the permission of their advisers. Mr. Higgins and staff. Summer Session only — not offered in 1963. Two hours daily, lec. and lab.; 2 cr.

71, 72. Agronomy Seminar. Library and reference work on special phases of soil and crop problems. Practice in looking up literature and in preparation and presentation of reports and abstracts. Staff. Required each semester of seniors and graduate students majoring in Agronomy; elective for other qualified students. 1 cr.

75, 76. Investigations In:

a. Crop Production — Mr. Higgins
b. Plant Breeding — Mr. Dunn
c. Physics and Chemistry of Soil — Mr. Prince
d. Soil Fertility — Mr. Peterson

Elective only after consultation with the instructor in charge. Hours to be arranged. 1-4 credits.

ANIMAL SCIENCE

Gerald L. Smith, *Associate Professor;* Loring V. Tirrell, *Professor;* Fred E. Allen, *Professor;* Harold E. Kimball, *Riding Instructor*

2. Types and Market Classes of Livestock. Origin, history, development, characteristics, and adaptability of the different types of horses, cattle, sheep, and swine, with practice in judging. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

11. Livestock Judging. The principles and practice of judging horses, beef cattle, sheep, and swine. It includes trips to some of the best New England breeding establishments and is required of candidates for judging teams. Mr. Smith. 1 lab.; 1 cr.

13. Feeds and Feeding. The character, composition, and digestibility of feed stuffs and the principles and methods of feeding different classes of livestock. Mr. Smith. 3 lec.; 3 cr.

14. Advanced Livestock Judging. A continuation of Animal Science 11. It serves as a basis for the selection of a livestock team for competition

such as held at the Eastern States Exposition and the International Livestock Exposition at Chicago. Mr. Smith. Prereq.: An. Sci. 11, or permission of instructor. 1 lab.; 1 cr.

15. Systematic Anatomy. The general anatomy and physiology of domestic animals. Mr. Allen. 3 lec.; 3 cr.

16. Animal Diseases. The prevention, control, and treatment of the bacterial and parasitic diseases of domestic animals. Mr. Allen. Prereq.: An. Sci. 15, or permission of instructor. 3 lec.; 3 cr.

18. Meat and Its Products; Livestock Markets. Slaughtering, meat cutting, curing, and indentification of cuts, livestock markets, stockyards, and transportation, with trips to slaughter houses and packing plants. Mr. Smith. 1 lec.; 1 lab.; 2 cr.

19. Management of Beef Cattle and Swine. Selection, feeding, breeding, management, and preparation for the show ring of beef cattle and swine with special reference to New England conditions. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

20. Sheep Science. Selection, breeding, feeding, management, and preparation for the show ring of sheep, with special reference to New England conditions. Mr. Tirrell and Mr. Smith. 2 lec.; 1 lab.; 3 cr.

21. Light Horse Science. Origin, history, development, judging, selection, feeding, breeding, and management of light horses. Special emphasis will be placed upon saddle-horse selection, the show ring classes, and judging. Horse show management will be discussed. Mr. Tirrell. 2 lec.; 1 lab.; 3 cr.

23, (23). Horsemanship. Instruction in riding using University-owned Morgans under supervision of a special riding instructor. It may be possible for a limited number of students to stable their horses at the University upon proper authorization. Any student wishing to use this course to satisfy an activity requirement in Physical Education for Women will register for Physical Education 1, 2, 3, or 4. Two one-hour or one two-hour riding periods per week for which a fee of $35 per quarter is charged. Mr. Kimball. 1 cr.

51. Animal Breeding. The principles and practices of breeding farm animals, including cross-breeding, in-breeding, selection, inheritance, breed analysis, reproductive efficiency, fertility and sterility. Mr. Smith. 3 lec.; 3 cr.

52. Animal Science Seminar. Library and reference work and preparation of papers on various Animal Science subjects. Mr. Tirrell. 1 to 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

George R. Thomas, *Professor;* John W. Hatch, *Associate Professor;* Richard D. Merritt, *Assistant Professor;* John Laurent, *Assistant Professor;* Winifred Clark, *Assistant Professor;* James A. Fasanelli, *Assistant Professor;* Christopher C. Cook, *Instructor;* Daniel L. Valenza, *Instructor;* Alfred R. Potter, *Instructor*

The Department of The Arts presents a series of changing exhibitions in the galleries in Paul Creative Arts Center, the Exhibition Corridor in Hewitt Hall, and the Memorial Union. Within a convenient radius of Durham are located a number of the country's important collections of art which students are encouraged to visit. Among these are: the Addison Gallery of American Art, the Currier Gallery of Art, the DeCordova and Dana Museum, the Lamont Gallery, several excellent museums and galleries in Boston, including the Museum of Fine Arts, the Gardner Museum, the Fogg Museum of Harvard University, and the Institute of Contemporary Art.

An experimental arts laboratory, the *Student Workshop,* is located in Hewitt Hall and is open to any student in the University, whether or not enrolled in art courses. This laboratory provides an excellent environment in which a student may explore materials, plan and execute projects of his own choice. Excellent facilities, including equipment ranging from small craft tools to industrial type machines, are available.

In those art courses where the student retains the finished work, he pays the cost of materials and supplies used. The University reserves the right to choose to exhibit a student's work for a period of not more than two years.

Students are responsible for the care of shops, studios, and all equipment therein; damage resulting through negligence or carelessness will be the responsibility of the student. Tools and other equipment will not be used until instruction in their use is given by the member of the staff in charge. Unless specifically authorized by the Chairman of the Department, projects not a part of the instructional program must be excluded from the studios.

3. Crafts. Structural and decorative design for craft projects using paper, wood, fabric, metal, leather, etc., which may be used in elementary and secondary schools. Leather work will be emphasized. Miss Clark. *For Art-Educaiton students;* also elective by permission. 2 lab.; 3 cr. Course fee for materials, $7.00.

4. Crafts. Structural and decorative design for craft projects using paper, wood, fabric, metal, and natural materials. These craft activities may be used in summer camps, playgrounds, settlement and scout groups. Silk screen printing will be emphasized. Miss Clark. *For Recreation Education, Physical Education, and Social Service students;* also elective by permission. 2 lab.; 3 cr. Course fee for materials, $7.00.

6, (6). Weaving. An introductory course in hand weaving, using the 4-harness loom. Plain and twill weaves, hand pattern techniques, 4-harness patterns for fabric and rug samples and projects using cotton, linen, wool, rayon, etc. Miss Clark. Elective by permission. 2 lab.; 3 cr. Course fee for materials, $7.00.

11, (11). Sculpture. Experimentation with three dimensional forms in clay, wood, stone, and metal as media for sculpture. The use of carving

chisels, pneumatic tools, and welding torch to either cut down or to build up compositions. The development of form, of volume, and of rhythm in space. Mr. Potter. Elective by permission. 2 lab.; 3 cr.

15, 16. Ceramics. Exploration of three dimensional forms in clay. A composite course dealing with the basic methods of construction of functional and non-functional forms in clay, with emphasis upon coil-built and slab-built pots, and the introduction to the potter's wheel. Studio practices in clay preparation, experimentation with glaze materials, formulation of glazes, various methods of decoration, and stacking and firing of the kilns. Mr. Potter. Elective by permission. 2 lab.; 3 cr. Course fee for materials, $8.00.

17, 18. Ceramics. Exploration of three dimensional forms in clay to develop the techniques and the art of throwing clay on the potter's wheel. Objects to be functional and non-functional with the emphasis upon refinement of form, integration of texture and color to a particular problem. Studio practices in clay preparation, experimentation with glaze materials, formulation of glazes, methods of decoration, and stacking and firing of kilns. Mr. Potter. Elective by permission. 2 lab.; 3 cr. Course fee for materials, $8.00.

20. Drafting and Space Planning. Basic drafting procedures, including lettering. Study of architectural symbols and interpretation of architectural plans. Problems of architectural design with emphasis on space utilization and space planning. Mr. Thomas. *For Hotel Administration students;* also elective by permission. 1 lec.; 2 lab.; 3 cr.

23, (23). Basic Design. A basic course in the structural and expressive use of the elements of design as a background for crafts, ceramics, sculpture, drawing and painting, advertising design, and illustration. A series of related lectures and demonstrations will be scheduled throughout the semester. Miss Clark, Mr. Hatch, Mr. Laurent, and Mr. Cook. Elective by permission. 1 lec.; 2 lab.; 2 cr. *No credit toward a major.*

24. Drawing and Design. A continuation of Arts 23 with problems in three dimensional design and drawing from the model and from nature. Mr. Hatch, Mr. Laurent, and Mr. Cook. Prereq.: Arts 23 and permission. 2 lab.; 2 cr. Course fee for materials, $2.50. *No credit toward a major.*

25, 26. Advanced Drawing and Painting. Drawing is concentrated in the fall semester; extensive drawing in studio and from nature, still life and figure drawing in a variety of media, i.e., pencil, pen, ink and wash, pastel, and watercolor. An introduction to oil painting composition, means of form description, and theories of color are presented in studio exercises and outdoor sketching in the spring semester. Mr. Hatch and Mr. Laurent. Elective by permission. 2 lab.; 3 cr.

27. Graphic Arts. Expression and experimentation in a variety of graphic techniques, i.e., linoleum and wood block printing, etching, lithography, serigraphy, etc., in black and white and color. Mr. Laurent. Elective by permission. 2 lab.; 3 cr. Course fee for materials, $8.00.

28. Advertising Design and Illustration. Creative design problems in various media and techniques in an introduction to the fields of advertising design and illustration. Mr. Hatch. Elective by permission. 2 lab.; 3 cr.

29, 30. Advanced Painting and Composition. An extension of Arts 25 and 26, stressing further development in the various media. Figure study and outdoor sketching also will be included. This course may be taken a second time with emphasis on the particular need of the individual. Mr. Laurent. Elective by permission. Labs. as arranged. 3 cr.

31, 32. Introduction to The Arts. A broad historical survey of man's creative efforts in their relation to contemporary cultural and social movements, presented as a background for interpreting the place of the arts in individual and community life of today. Illustrated lectures with assigned readings. Mr. Thomas and Mr. Fasanelli. 3 cr. *Not open to freshmen. No credit toward a major.*

39, (39). Photography. The theory and practice of photography, covering camera operation, developing, printing, and enlarging. Creative solutions are sought to problems which are designed to increase the students' perception. Mr. Merritt. Elective by permission. 1 lec.; 1 lab.; 3 cr. Course fee for materials, $8.50.

40. Advanced Photography. The basic theory and practice of color photography. Advanced projects in black and white. Techniques of creative photography including studio and laboratory controls. A portfolio of photographs, representative of the student's progress during the course, will be required. Mr. Merritt. Elective by permission. 1 lec.; 1 lab.; 3 cr. The course fee for materials will approximate $10.50. (Alternate years; offered in 1963-64.)

45, (45) – 46. Jewelry and Metalsmithing. Structural and decorative design and construction of jewelry, flatware and hollow ware using sterling silver, copper, brass, pewter. The skills of soldering, polishing, chasing, stone setting, casting, raising, forming are included. A unit in enameling on copper is part of the first semester course. Miss Clark. Elective by permission. 2 lab.; 3 cr. Course fee for materials, $7.00.

47, (47) – 48. Woodworking. A basic course in wood, stressing design and techniques in hand and machine work. Projects range from small carvings and turnings to major pieces of furniture. Techniques include veneering and solid wood jointery. Mr. Valenza. Prereq.: Arts 23 (or equivalent) and permission. 1 lec.; 2 lab.; 3 cr. Course fee for materials: $7.00 for Arts 47, $15.00 for Arts 48.

50. Studio Workshop. A course in painting, drawing, photography and print-making designed to subject the advanced student to an intensive experience in these four disciplines. This course is required for graduation in the painting and graphics option. Prereq.: Arts 25, 26, 27, 39 and permission. 4 lab.; 6 cr.

66. Crafts Workshop. Students in ceramics, jewelry and metalsmithing or woodworking may select one of these areas for advanced studio work. Miss Clark, Mr. Valenza, Mr. Potter. Prereq.: Arts 45-46, or Arts 47-48, or Arts 15, 16 or 17, 18 and permission. Labs. as arranged. 6 cr. maximum.

78. Water Media. A studio course dealing with various water media, transparent and opaque. Projects will stress the handling of watercolor and casein. Inks, temperas, and polyvinal will also be introduced. Mr. Hatch. Prereq.: Arts 23, 24 (or equivalent) and permission. 2 lab.; 3 cr. (Alternate years; offered in 1963-64.)

81. American Art. A chronological survey of the architecture, painting, sculpture and minor arts of the United States from earliest Colonial times to the mid-20th Century. Emphasis on architecture and the minor arts of the late 19th and 20th Centuries. Architectural field trips and museum visits in New Hampshire and Massachusetts. Mr. Thomas. 3 cr. (Alternate years; not offered in 1963-64.)

82. Classical Art. A survey of the monuments in Greece and Rome covering the following periods: archaic, classical and Hellenestic in Greece, and the areas influenced by Greek culture; late Republican and Imperial Rome. Significant works from about the mid-8th Century B. C. to the 2nd and 3rd Centuries A. D. are analyzed chronologically. The aim of this course is to give the student a comprehensive picture of the classical achievement, primarily in architecture and sculpture, and to bring to the student's attention more modern debts to the past. Mr. Fasanelli. 3 cr.

83. Primitive and Oriental Art. An inquiry into the origins of art in pre-history, an investigation of the art of selected primitive cultures, and a study of Oriental Art concentrating on the pictorial development of China and Japan. This course is primarily concerned with the evolution of pictorial and sculptural images essentially foreign to the classic western tradition. Mr. Hatch. 3 cr. (Alternate years; not offered in 1963-64.)

84. Medieval Art. A chronological survey of the vast material of the Middle Ages, from the 1st and 2nd Centuries A. D. to the 14th Century. This course covers architecture, sculpture, mosaics, manuscripts, and the minor arts. The transitional character of this vast period will be stressed, as well as its dependence upon the antique past. Architecture and the more minor arts will be accented. Mr. Fasanelli. 3 cr. (Alternate years; not offered in 1963-64.)

85. The Art of the Renaissance. A historic survey of the achievements of Western civilization in sculpture, painting, and architecture from the Gothic cathedral to the 18th Century drawing room. Illustrated lectures with assigned readings. Mr. Fasanelli. 3 cr. (Alternate years; offered in 1963-64.)

86. Northern Painting. This course is devoted to the study of the development of painting in Flanders, France, and Germany from the late 14th to the early 15th Century. Beginning with a study of French manuscripts, this course will deal largely with Flemish painting in the 15th Century. Following this survey extant French monumental painting will be discussed. Analysis of German painting in the 15th Century will then be discussed and the dependence of this body of material on Flemish developments, as well as Italian, will be dealt with throughout the course. Mr. Fasanelli. 3 cr. (Alternate years; not offered in 1963-64.)

87. Baroque Art. This is an advanced course which is a survey of architecture, sculpture and painting, in the countries of western Europe in the 17th and 18th Centuries. The problem of the "Baroque" and the difficulty of defining an international style at a moment when national identities are strong. It is a companion to Arts 25, but is differently oriented. Mr. Fasanelli. 3 cr. (Alternate years; not offered in 1963-64.)

88. Modern Art. From Louis XVI to Picasso; traces the history of painting through the various revolutions, political and aesthetic, that resulted

in the many schools of thought prevalent in 19th and 20th Century art, i.e., classicism, impressionism, cubism, etc. Illustrated lectures with assigned readings. Mr. Fasanelli. 3 cr.

(97). Seminar in Art History. This course is a seminar which every student electing to major in the history option must take at least once. The prerequisite for taking the course is the completion of some work in any one of the survey courses offered in the option in the history of art. The seminar's aims are to direct further work in some area already studied. The students are introduced to advanced problems of a bibliographical, critical, and iconographical nature in a series of preliminary lectures. Every student is required to present the results of his research in a formal presentation of his paper at the end of the term. Mr. Fasanelli. 3 cr.

99, (99). Problems in the Visual Arts. Advanced students may select a special problem in one of the visual arts in which they have exhibited proficiency, to be developed by means of conferences and studio work. Mr. Thomas and staff. Prereq.: Permission of Department Chairman. Credits to be arranged. *This course may be repeated to a total of not more than 6 credits.*

Art-Education (Art-Ed.) 91. Problems of Teaching Art in Elementary Schools. The purposes and objectives of teaching art in elementary schools; selection and organization of teaching material; teaching techniques which may be advantageously employed in the elementary schools. Mr. Thomas. Open only to students in the Art-Education curriculum. Prereq.: Educ. 58 with grade of C or better. 2 lec.; 1 lab.; 3 cr.

Art-Education (Art-Ed.) (92). Problems of Teaching Art in Secondary Schools. The purpose and objectives of teaching art in the secondary schools; selection and organization of teaching materials; teaching techniques which may be advantageously employed in the secondary-school art program. Mr. Thomas. Open only to students in the Art-Education curriculum. Prereq.: Educ. 58 with a grade of C or better. 2 lec.; 1 lab.; 3 cr.

Education-Art (Ed-Art) 94. Supervised Teaching in Art. Prereq.: Art-Ed. 92 One semester of supervised teaching. 14 cr.

BIOCHEMISTRY

Edward J. Herbst, *Professor;* Thomas G. Phillips, *Professor Emeritus;* Arthur E. Teeri, *Professor;* Stanley R. Shimer, *Professor;* Douglas G. Routley, *Assistant Professor*

1. Organic and Biological Chemistry. An introduction to organic chemistry and a brief survey of biological chemistry. Mr. Shimer. Prereq.: Chem. 2, or 4. 3 lec.; 2 lab.; 5 cr.

2. Plant Chemistry. The chemistry of plant growth. Mr. Routley. Prereq.: Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

4. Animal Nutrition. The chemistry of animal nutrition. Mr. Shimer. Prereq.: Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

6. Chemistry of Food and Nutrition. The chemistry of food materials and of digestion, absorption, metabolism, and excretion. Prereq. Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr. (Not offered in 1963-64.)

51-52. General Biochemistry. The fundamental principles of biochemistry, with emphasis on the chemical properties, principal metabolic pathways, and functions of carbohydrates, lipids, and nitrogenous compounds. Mr. Shimer, Mr. Teeri. Prereq.: Satisfactory preparation in organic chemistry and quantitative analysis. Bio.Ch. 51: 3 lec.; 2 lab.; 5 credits. Bio.Ch. 52: 3 lec.; 3 credits.

56. Physiological Chemistry. The qualitative and quantitative methods fundamental to medical diagnostic work. The chemistry of fats, carbohydrates, and proteins; enzymes, digestion, metabolism, and excretion. Mr. Teeri. Prereq.: Satisfactory preparation in organic chemistry and quantitative analysis. 3 lec.; 2 lab.; 5 cr.

BIOLOGY

1-2. Man and the Living World. A basic course in biology, designed to give the student fundamental facts about himself and an understanding of his relation to the living world, both plant and animal, of which he is a part. 2 lec.; 1 lab.; 3 cr. *No credit toward a major.* (Bot. 1 may be used as a prerequisite for Biol. 2.)

3. Man and the Living World. An advanced-standing course open to freshmen and sophomores who have had good background in high school biology and elementary physical sciences. During the first week of classes, a placement test covering these areas will be given to all students registering for Biology 1. Students wishing to enroll in Biology 3 may so indicate when they take the placement test. Admission to Biology 3 will have the effect of waiving three hours of the six credit hours required in the biological sciences. Further information concerning admission to this course can be obtained from Mr. George M. Moore. 2 lec.; 1 lab.; 3 cr. *No credit toward a major.*

61-62. Clinical Laboratory Methods. An 11-month course in medical technology taken at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. This course starts about June 20, and includes lectures and laboratory work in bacteriology, blood bank and serology, clinical chemistry, hematology, laboratory management and ethics, mycology, parasitology, histology, and clinical microscopy. Credits will be allowed when the University has received a transcript of the candidate's record and upon certification by the Director of the School and the Supervisor of the Medical Technology curriculum that the work has been successfully completed. This course qualifies a candidate for the examination for the Medical Technologist's Certificate administered by the Registry of Medical Technologists of the American Society of Clinical Pathologists. 32 cr. *This course cannot be taken for graduate credit.*

Biology-Education (Biol-Ed.) 91. Problems in the Teaching of High-School Biology. Objectives and methods of teaching. The selection and organization of materials; the preparation of visual aids; the setting up of aquaria and other projects. The use of the field trip as a tool in teaching high-school biology. Mr. Schaefer. Prereq.; Two years of biological science and Educ. 58 with a grade of C or better. 2 lec.; 1 lab.; 3 cr.

Education-Biology (Ed-Biol.) 93, 94. Supervised Teaching in High-School Biology. (See description under Education.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

BOTANY

ALBION R. HODGDON, *Professor;* M. C. RICHARDS, *Professor;* AVERY E. RICH, *Professor;* STUART DUNN, *Professor;* CHARLOTTE G. NAST, *Associate Professor;* MARION E. MILLS, *Assistant Professor Emerita;* RICHARD SCHRIBER, *Assistant Professor*

1. GENERAL BOTANY. An introduction to plant science. The evolution of structure and function in the plant kingdom. Elective as a prerequisite for Biol. 2; required as a prerequisite for Zool. 48. Mr. Schreiber. 3 lec.; 1 lab.; 4 cr.

3. THE PLANT WORLD. A survey of the plant kingdom from an evolutionary point of view. The structure and function of plant parts. Miss Nast. Prereq.: Biol. 1-2, or Bot. 1 and Bio. 2. 2 lec.; 2 lab.; 4 cr.

6. SYSTEMATIC BOTANY. The identification and classification of our native trees, shrubs and wild flowers. Mr. Hodgdon. Prereq.; Biol. 1 or Bot. 1. 1 lec.; 2 lab.; 3 cr.

42. PLANT ECOLOGY. Plant life and its environment, including a consideration of the principal environment factors, such as light, temperature, soil, water, and biotic relations; study of associations, successions, and plant forms; a survey of plant distribution and underlying causes. Mr. Hodgdon. Prereq.: Bot. 1 or Bot. 3. 3 cr.

51. PLANT PATHOLOGY. The nature of disease in plants, the etiology, symptomatology, and classification of plant diseases. Mr. Rich. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

52. PRINCIPLES OF PLANT DISEASE CONTROL. Exclusion, eradication, protection, and immunization, and the specific, practical methods used to control plant diseases. Mr. Rich. Prereq.: Bot. 51. 1 lec.; 2 lab.; 3 cr. (Alternate years; offered 1963-64.)

53. PLANT ANATOMY. The anatomy of vascular plants with special emphasis upon tissue development and structure. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

54. CYTOLOGY. The structure, physiological behavior, and development of cells. The cellular basis of heredity. Mr. Schreiber. Prereq.: a year each in the biological sciences and in chemistry. 3 lec.; 3 cr.

55. ADVANCED SYSTEMATIC BOTANY. The principles and laws of plant classification and nomenclature: study of plant families, field and herbarium work. Mr. Hodgdon. Prereq.: Bot. 6. Hours to be arranged. 3 cr. (Not offered in 1963-64.)

56. PLANT PHYSIOLOGY. Structure and properties of cells, tissues, and organs; absorption and movement of water; metabolism; growth and irritability. Mr. Dunn. Prereq.: Bot. 1 or Bot. 3, and one year of chemistry. 2 lec.; 2 lab.; 4 cr.

57, 58. INVESTIGATIONS IN: a. Systematic Botany — Mr. Hodgdon. b. Plant Physiology — Mr. Dunn. c. Plant Pathology — Mr. Rich. d. Plant Anatomy, and Morphology — Miss Nast. e. Plant Ecology — Mr. Hodgdon. f. Aquatic Plants — Mr. Hodgdon. g. Cytology — Mr. Schreiber. Elective only after consultation with the instructor in charge. Hours to be arranged. 2 to 6 credits.

59, 60. Botany Seminar. Library and reference work and the preparation of papers and abstracts on special phases of botany. Practice in the preparation of oral and written reports. Botany staff. Prereq.: Six hours of botany or permission of the Chairman of the Department. This course may be repeated for credit. 1 lec.; 1 cr.

62. Morphology of the Vascular Plants. The life histories and evolution of the extinct and living Pteridophytes, Gymnosperms, and Angiosperms, including comparisons of general structure and sexual organs. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 2 lec.; 2 lab.; 4 cr. (Alternate years; not offered in 1963-64.)

64. Microtechnique. A methods course in embedding, sectioning, and staining plant tissues, and introduction to microscopy. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 3 cr.

68. Mycology. Studies of the parasitic and saprophytic fungi, their growth, reproduction, and identification. Mr. Richards. 1 lec.; 2 lab.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

BUSINESS ADMINISTRATION

Arthur W. Johnson, *Professor;* Carroll M. Degler, *Professor;* John A. Beckett, *Professor;* Ronald D. Michman, *Assistant Professor;* John A. Bassett, *Instructor;* Russell W. Johnson, *Instructor;* Charles E. Off, *Part-time Instructor;* Joseph E. Michael, Jr., *Lecturer*

1-2. Principles of Accounting. A survey of accounting with emphasis on accounting as a tool of management. Designed as an introductory course for both accounting majors and non-majors. Mr. Bassett, Mr. Russell Johnson, and Mr. Off. 3 cr.

3-4. Intermediate Accounting. A study of accounting theory and principles through cases and problems. The form, content, and uses of financial statements and the valuation of and accounting for inventories, receivables, investments, and fixed assets. A discussion of capital stock, surplus, reserves, and statement analysis is also included. Prereq.: B.A. 2. 3 cr.

8. Cost Accounting. Analysis of the purposes and limitations of costs for use in the formation of corporate policy. Observation through case materials of the costing practices of a wide variety of companies. Mr. Beckett. Prereq.: B.A. 2. 3 cr.

9. Hotel and Restaurant Accounting. A study of hotel and restaurant accounting systems with emphasis on internal control. Includes study and interpretation of operating statistics and financial reports. Food and beverage cost accounting is also presented. Mr. Russell Johnson. Prereq.: B.A. 2. 3 cr.

21-22. Commercial Law. The law of contracts, agency, sales, negotiable instruments, partnerships, and corporations. Mr. Michael. *Open to juniors and seniors.* 3 cr.

23, (23). Business Communication. Report writing, including preparation of charts, forms and graphs; intra-office, inter-office, and inter-business

communication; instruction data for employees, minutes of meetings, and manuals of company practices and procedures; business letters. Mr. Schultz and Mr. Baier. *Not open to freshmen.* 3 cr.

25, (25). Marketing. A study of the marketing behavior of the firm and its consequences for the economy as a whole. Topics include: price and non-price competition, wholesaling, retailing, marketing consumer and industrial goods, consumer behavior, and the influence of technology on market structure. Mr. Michman. Prereq.: Econ. 2. 3 cr.

27. Transportation. A study of rail, highway, air, water, and pipeline transportation. The relationship of transportation to production and distribution. Emphasis is on rate structure, competition, and cooperation among carriers, equipment and facilities, and government regulation. Consideration is given to special aspects of problems of administration and organization and the development of a national transportation policy. Mr. Michman. Prereq.: Econ. 2. 3 cr.

33. Managerial Organization. The firm in the industry. Structure, organization, and operation of business enterprise. Management tools and techniques. Mr. Beckett. Prereq.: Econ. 2 and junior standing. 3 cr.

43. Production Management. Principles of production organization, product design, materials acquisition, layout, production engineering, mechanization, production scheduling, and control. Mr. Off. Prereq.: Econ. 2. 3 cr.

47. Advertising. Advertising as an element of marketing strategy for the firm. Management considerations involved in media selection, campaign planning, effectiveness testing, budget allocation, and consumer behavior studies. Consideration is given to the social and economic characteristics of advertising policy. Mr. Michman. Prereq.: B.A. 25. 3 cr.

50. Marketing Management. A study of the inter-relation of marketing, production and finance. Topics include: planning and developing the product, testing, brand management, packaging, sales organization, forecasting, and control. Policy formulation and decision making is emphasized. Mr. Michman. Prereq.: B.A. 25. 3 cr.

52. Marketing Research. The study of marketing research as a basis for formulating marketing policies and strategy. Topics include: research design, methods of collecting data, planning the investigation, sampling methods, motivation research, advertising research, and operations research. Mr. Michman. Prereq.: B.A. 25. 3 cr.

55. Advanced Accounting I. Similar in format to B.A. 3-4, with emphasis on the partnership form of business organization, consignment and installment sales, consolidations and mergers, liquidations, and other topics of an advanced nature. Prereq.: B.A. 4. 3 cr.

56. Federal Taxation. Current federal income, estate, and gift taxes and their impact on corporations, partnerships, and individuals. Prereq.: B.A. 4. 3 cr.

57. Auditing and Business Systems. The work of the independent public accountant and the company-employed auditor with reference to the establishment and use of internal control and data processing systems for managerial and other purposes. Case materials in the conduct of an audit.

Introduction to the practice of management consulting and systems and procedures work. Mr. Beckett. Prereq.: B.A. 4 or permission of instructor. 3 cr.

58. Investments. The problems of investment; investment characteristics of stocks and bonds; public utility, railroad, industrial, and government securities; protection of the investor; investment banking; and related problems. Mr. Degler. Prereq.: Econ. 2. 3 cr.

60. Advanced Accounting II. Problems and questions in theory, practice, and auditing. Preparation for and review of past C.P.A. examinations. Prereq.: B.A. 55. 3 cr.

61. Financial Control. Analysis and interpretation of accounting data as presented in corporate balance sheets and operating statements for managerial control purposes. Prereq.: B.A. 4 or permission of instructor. 3 cr.

68. Personnel Administration. Methods, techniques, and psychology employed in personnel administration from the standpoint of the manager. The case study method is used. Mr. Off. Prereq.: Econ. 2. 3 cr.

71. Corporations. A study of the role of the modern corporation in the economy. Emphasis upon structure of the corporation, the corporate system, combination, and concentration. Mr. Degler. Prereq.: Econ. 2. 3 cr.

72. Corporation Finance. A study of sources and uses of corporate funds; securities and securities market; methods of financing; and financial policy. Mr. Degler. Prereq.: Econ. 2. 3 cr.

74. Business Policy. Administrative practice of business management; use of business tools; processes of integrating operations, administering business systems, selecting goals and objectives, and formulating policy. Mr. Beckett. Prereq.: senior standing and permission of instructor. 3 cr.

CHEMICAL ENGINEERING

Oswald T. Zimmerman, *Professor;* Irvin Lavine, *Professor;* Stephen S. T. Fan, *Assistant Professor*

42. Chemical Engineering Principles I. Systems of units, and dimensional analysis; material and energy balances; heats of reaction; chemical equilibria, introduction to fluid flow and heat transfer; introduction to thermodynamics, including the classical laws and their application to flow and non-flow processes. Mr. Lavine. 3 lec.; 3 cr.

51. Chemical Engineering Principles II. Transport phenomenon and stage operations. The equations of change as a basis for the study of molecular and turbulent transport of momentum, energy and mass, with emphasis upon the relation between the transport mechanism and the mathematical expression. Design principles and procedures for stagewise operations in various co-current and counter-current arrangements, based upon the ideal stage concept. Problems in both steady state and non-steady state operations. Mr. Lavine. 3 lec.; 1 lab.; 4 cr.

52. Chemical Engineering Principles III. Analysis of unit operations. Study of chemical engineering systems, with emphasis on the unit operations involved. Extension of previous studies of unit operations, and treat-

ment of operations not previously considered. Mr. Zimmerman. 3 lec.; 1 lab.; 4 cr.

54. Chemical Engineering Principles IV. Chemical kinetics, catalysis, and introduction to reactor design. Study of types of kinetic behavior in chemical processes; prediction of reaction rates in batch and flow reactors with and without catalysis; and application to reactor design. Mr. Fan. 3 lec.; 1 lab.; 4 cr.

63. Chemical Engineering Principles V. Special methods of mathematical analysis including transform methods, calculus of finite differences, and numerical techniques; and the use of analog and digital computors in the solution of chemical engineering problems. Mr. Fan. 3 lec.; 1 lab.; 4 cr.

66. Chemical Engineering Economics and Plant Design. The principles of cost engineering, including estimation of plant investment, working capital, operating costs, labor requirements, payout time, and profitability. Value of money, capitalized costs, simple and compound interest, depreciation, taxes and insurance, labor requirements, overhead, financing of chemical enterprises, design of equipment and plants for minimum cost, plant location, transportation, sales cost, equipment cost, and cost indexes. Each class selects one or more problems involving the complete design of a chemical plant. For each problem, the most desirable process must be determined, the site selected, the equipment and plant designed, calculations made for all costs, profitability and payout time, and a complete report prepared, including the drawings of equipment and plant layout. Mr. Lavine. 1 lec.; 3 lab.; 4 cr.

67. Chemical Engineering Thermodynamics. General thermodynamic relationships and their application to power generation, refrigeration, and chemical processes; chemical equilibria and equilibrium in phase-change separations; introduction to statistical mechanics, and thermodynamics of irreversible processes. Mr. Fan. 3 lec.; 3 cr.

68. Physical Metallurgy. An introductory study of the nature of metals, emphasizing the quantum mechanical description of the solid state and including atomic structure, bonding, historical development of metal theories, elementary zone or band theory, and X-ray diffraction. The microscopic metal system is also considered, and thermodynamics of metallurgical processes, defects and dislocations, phase relations of pure metals and alloys, microstructure, and physical and thermal treatment of metals are discussed. Study of some non-metals is also included. Mr. Zimmerman. 3 lec.; 1 lab.; 4 cr.

69. Chemical Engineering Project. Each student selects a research problem which he carries out independently under faculty supervision. Intensive study in both the library and the laboratory and a satisfactory report upon completion of the work are required. Staff. 3 lab.; 3 cr.

81. Process Dynamics. Study of responses of physical systems and feedback principles, and their application to design and analysis of process control systems. Mr. Zimmerman. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

CHEMISTRY

ALEXANDER R. AMELL, *Professor;* HAROLD A. IDDLES, *Professor;* ALBERT F. DAGGETT, *Professor;* HELMUT M. HAENDLER, *Professor;* HENRY G. KUIVILA, *Professor;* ROBERT E. LYLE, JR., *Professor;* CHARLES M. WHEELER, JR., *Associate Professor;* PAUL R. JONES, *Associate Professor;* FRANK L. PILAR, *Associate Professor;* ALBERT K. SAWYER, *Assistant Professor;* GLORIA G. LYLE, *Assistant Professor;* KENNETH K. ANDERSEN, *Assistant Professor;* DAVID W. ELLIS, *Assistant Professor;* PAUL S. ANDERSON, *Instructor*

1-2. GENERAL CHEMISTRY. Elementary chemistry with lecture demonstrations and laboratory practice. Topics of interest to the professional student and of general interest are presented. For Agriculture and Home Economics students and as an elective. Mr. Amell and assistants. 3 lec.; 1 lab.; 4 cr.

3-4. GENERAL CHEMISTRY. The fundamental laws and conceptions of chemistry, including a study of the nonmetals and metals and their compounds. The theoretical principles are illustrated by lecture demonstrations, and the applications of chemistry in the professions are explained. Mr. Sawyer, Mr. Haendler, Mr. Wheeler, Mr. Anderson, and assistants. For students who plan to take further courses in the Department of Chemistry. 2 lec.; 1 rec.; 1 lab.; 4 cr.

5-6. INORGANIC CHEMISTRY. General inorganic chemistry, including qualitative analysis. The preparation of secondary school chemistry will furnish a basis for a thorough course for Chemistry majors and others who may elect the course. Mr. Sawyer and assistants. 3 lec.; 1 rec.; 2 lab.; 6 cr.

17, (17). QUANTITATIVE ANALYSIS. An elementary course in quantitative analysis designed for those students desiring a brief terminal course in analytical chemistry. Mr. Ellis and assistants. Prereq.: Chem. 4. 2 lec.; 2 lab.; 4 cr.

21, (21). SEMIMICRO QUALITATIVE ANALYSIS. The fundamental theories of solutions as applied to the reactions of qualitative analysis. Problem work is required. The laboratory work uses the semimicro technique and provides ample experience in the analysis of simple and complex mixtures. Mr. Haendler and assistants. Prereq.: Chem. 4. 2 lec.; 2 lab.; 4 cr.

22. QUANTITATIVE ANALYSIS. The theory and laboratory technique of the more common determinations of gravimetric and volumetric analysis. Emphasis on the solution of problems. A comprehensive study of the more common analytical methods. Mr. Daggett and assistants. Prereq.: Chem. 21. 2 lec.; 3 lab.; 5 cr.

45, (45). ORGANIC CHEMISTRY. An introductory but comprehensive study of the chemistry of carbon compounds with emphasis on the particular phases of the subject needed by students preparing to be technicians, nurses, majors in biological sciences, and others, where a brief course is desired. Mrs. Lyle. Prereq.: Chem. 3-4. (Elective for Medical Technology, Nursing, and Pre-Dental students and majors in Botany.) 3 lec.; 2 lab.; 5 cr.

47-48. ORGANIC CHEMISTRY. The principal classes of organic compounds, aliphatic and aromatic, with emphasis on class reactions and structural theory. Laboratory exercises in the preparation and purification of selected organic compounds; also the use of group reactions for the identification of organic substances in a systematic scheme of qualitative organic analysis. Mr. Jones, Mr. Anderson, and assistants. 3 lec.; 2 lab.; 5 cr.

51-52. Organic Chemistry. The principal classes of organic compounds, aliphatic and aromatic, with emphasis on class reactions and structural theory. Laboratory exercises in the preparation and purification of selected organic compounds. Mr. Anderson and assistants. Prereq.: Junior standing. 3 lec.; 2 lab.; 5 cr.

55-56. Structural and Theoretical Problems of Modern Organic Chemistry. The methods of preparation and reactions of the principal classes of organic compounds. The electron theory of organic chemistry is used to correlate these reactions. The variation in reactivity of these various classes of organic compounds is utilized as a method of characterization of organic compounds. Emphasis is on the solution of assigned problems. Mr. Lyle. Prereq.: One year of Organic Chemistry. 3 lec. for Chem. 55; 1 lec. and 2 labs. for Chem. 56; 3 cr.

61-62. Analytical Chemistry. A thorough treatment of the theory and techniques of gravimetric and volumetric analysis followed by special methods of analysis such as those of ion exchange, chromatography, EDTA titrations and instrumental methods such as emission spectrography, flame spectrometry, spectrophotometry, gas chromatography, coulometry, potentionmetry, conductimetry, and polarography. Mr. Daggett. Prereq.: Chem. 5, 6. 3 lec.; 2 lab.; 5 cr.

63. Introductory Radiochemical Techniques. Radiochemical techniques and laboratory practice in the use of apparatus in many fields of science which utilize radio-chemical operations. Mr. Amell. Prereq.: General Inorganic Chemistry and General Physics. 3 lec.; 2 lab.; 5 cr.

82. Introductory Physical Chemistry. Kinetic theory of gases; quantitative laws for behavior of matter in the gas, liquid, and solid phases; valence and the chemical bond; radioactivity; atomic structure and valence; laws of solutions; homogenous and heterogenous equilibrium; colloids, electrochemistry. Designed for Pre-medical and Biology students. Prereq.: Chem. 17-21, Phys. 2, Elementary Mathematics. 3 lec.; 1 lab.; 4 cr.

83-84. Elementary Physical Chemistry. The properties of gases, liquids, and solids; thermochemistry and thermodynamics; solutions, chemical equilibria, reaction rates, conductance, and electromotive force. Mr. Wheeler. Prereq.: Math. 23 or 26, and Physics; prerequisite or concurrent: Analytical Chemistry. 3 lec.; 2 lab.; 5 cr.

85. Inorganic Chemistry. The relationship between chemical reactions and modern concepts of inorganic chemistry on a moderate level. The applicability and limitations of the newer ideas. Mr. Haendler. Prereq.: Chem. 83-84, or permission. 3 lec.; 3 cr.

86. Advanced Physical Chemistry. A review of selected topics in elementary physical chemistry. Mr. Amell. Prereq.: One year of Physical Chemistry. 3 lec.; 3 cr.

87, 88. Chemical Literature and Seminar. Use of the Chemical Library; student reports on topics of interest. Mr. Lyle and Mr. Kuivila. Prereq.: Chem. 48 or 52 and 84. 1 lec.; 1 cr.

89-90. Thesis. The related background and experimental observation of the year's investigation in some selected subject is required. Members of the staff. For seniors in Chemistry who have completed Chem. 48, 62, 84, and have a good point average. 5 lab.; 6 cr.

For courses primarily for graduate students see catalogue of the Graduate School

CIVIL ENGINEERING

J. Harold Zoller, *Professor;* Russell R. Skelton, *Professor;* Charles O. Dawson, *Professor;* Harold E. Langley, Jr., *Associate Professor;* Tung Ming Wang, *Assistant Professor;* Robert B. McEwen, *Instructor*

1. Surveying I. Engineering measurements, using tape, transit, level, and stadia, and the computation, adjustnent, and plotting of such measurements. Mr. Dawson and Mr. McEwen. Prereq.: Math. 21. 1 lec.; 2 lab.; 3 cr.

2. Surveying II. Applications of engineering measurement theory; orientation by solar and Polaris observations; theory and use of the plane table; introduction to photogrammetry, simple curves, and earthwork computations. Mr. Dawson and Mr. McEwen. Prereq.: C. E. 1. 1 lec.; 2 lab.; 3 cr.

7, (7). Elementary Surveying. A course for non-civil engineering students in the theory and use of tape, level, transit, plane table, and stadia in making plane and topographic surveys. Computations and drafting exercises necessary for making surveys and maps for all purposes. Mr. Dawson. 2 lec.; 1 lab.; 3 cr.

17. Engineering Materials. Methods of manufacture, physical properties and the application of the various materials used in civil engineering works, including timber, steel, stone, brick, cement, concrete, and bituminous materials. Laboratory tests and reports on the testing of cements, aggregates, concrete specimens, cast iron, structural steel, wood, and other engineering materials. Prereq.: M.E. 35 concurrently or as a prerequisite. 2 lec.; 1 lab.; 3 cr.

25. Theory of Structures I. The stress analysis of structures under fixed and moving loads. Roof trusses, highway and railroad bridges; use of influence lines, lateral bracing, and portals. Mr. Wang and Mr. Zoller. Prereq.: M.E. 35 as a prerequisite or concurrently. 3 lec.; 1 design period; 4 cr.

49, (49). Independent Study. A limited number of qualified senior students will be permitted to pursue independent studies under faculty guidance and may write terminal theses reporting the results of their investigations. Prereq.: Permission of the instructor and senior standing. 2 to 4 cr.

50. Transportation Engineering. The development, organization, administration, and inter-relation of transportation systems and facilities, including railroads, highways, airports, waterways, and pipe lines. Major emphasis will be given to the economics of location, geometric and structural design, construction materials, methods and costs, as applied to modern transportation engineering. Mr. Skelton. Prereq.: C. E. 2. 3 lec.; 3 cr.

52. Fluid Mechanics. Properties of fluids; fluids statics; flow of incompressible and compressible ideal fluids; flow of real fluids; and measurement of fluid properties. Mr. Dawson and Mr. Zoller. Prereq.: M. E. 35 and Math. 23 or 26. 3 lec.; 3 cr.

53, (53). Fluid Mechanics Lab. Experimental study of fluid properties and their relation to the solution of practical problems. Mr. Dawson. Prereq.: C. E. 52 as a prerequisite or concurrently. 1 lab.; 1 cr.

(54). Soil Mechanics. Soil classification, physical properties including permeability, compressibility, bearing capacity, settlement and shear resistance are related to the principles underlying the behavior of soils subjected to various loading conditions. Underground exploration and typical foundation problems are included. Mr. Skelton. Prereq.: C. E. 50 or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

56. Steel Design. The design of members and connections; tension and compression members, beams, plate girders; riveted, bolted, and welded joints. Mr. Wang. Prereq.: C. E. 17 and 25. 2 lec.; 1 design period; 3 cr.

57. Theory of Structures II. Beam and truss deflections. The analysis of continuous beams and rigid frames by classical and modern methods; indeterminate trusses. Mr. Wang. Prereq.: C.E. 56. 3 lec.; 1 design period; 4 cr.

59. Reinforced Concrete Design. The principles of reinforced concrete, including rectangular beams, slabs, T-beams, columns, footings, retaining walls. Mr. Wang. Prereq.: C. E. 57 as a prerequisite or concurrently. 2 lec.; 1 design period; 3 cr.

60. Structural Engineering. The planning and design of determinate and indeterminate structures. Introduction to modern design theories; prestressed concrete, plastic theory of steel and reinforced concrete. Mr. Wang. Prereq.: C.E. 57 and C.E. 59. 2 lec.; 1 design period; 3 cr.

63. Water Supply and Treatment. The sources, quantity, quality, and sanitary aspects of public water supplies. Methods of purification and distribution systems. Mr. Langley. Prereq.: C.E. 52. 3 lec.; 3 cr.

64. Sewerage and Sewage Treatment. The theory and problems of sewerage, the principles governing the disposal of sewage, and the various methods of sewage treatment. Mr. Langley. Prereq.: C.E. 63. 3 lec.; 1 lab.; 4 cr.

65. Hydraulic Engineering. Application of fluid mechanics to hydraulics problems, such as reservoirs, dams, control works, open-channel flow, hydroelectric power, irrigation, drainage, and multipurpose projects. Prereq.: C.E. 52. 2 lec.; 1 lab.; 3 cr.

66. Hydrology. The occurrence and physical effects of water on the earth, including meteorology, groundwater, runoff, and streamflow routing. Prereq.: C.E. 52 concurrently or as a prerequisite. 2 lec.; 1 lab.; 3 cr.

67. Highway Engineering I. Highway organization, administration, finance, planning, programming, traffic surveys, traffic methods; highway laws, contracts, specifications; highway capacity, geometric design, access control, safety, accident studies; pavement selection, performance, and maintenance. Mr. Skelton. Prereq.: C.E. 50. 3 lec.; 3 cr.

68. Highway Engineering II. Design of flexible and rigid pavements and bases for highways, airports, and city streets; pavement selection, construction methods, materials, specifications, and engineering cost estimates. Mr. Skelton. Prereq.: C.E. 50. 3 lec.; 1 lab.; 4 cr.

71. Community Planning. An introduction to community planning. Social, economic, and physical factors affecting community planning; content and extent of desirable community planning programs, including purpose and scope, the preliminary survey, elements of community land plan-

ning, the master plan, transportation systems, street patterns and traffic, motor vehicle parking, airport sites, public building sites, parks and recreational facilities, zoning, control of land subdivision, neighborhood centers, housing, legal, financial and economic problems, and redevelopment of blighted areas. Mr. Dawson. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

74. Timber Design. Properties and characteristics of structural woods, mechanics of wood, connection methods, design of timber members and connections in beams, columns, and trusses, and glued laminates of wood. Mr. Wang. Prereq.: C.E. 56 and permission of the instructor. 1 lec.; 1 design period; 2 cr.

77. Contracts, Specifications, and Professional Relations. The essential elements required in engineering contracts; the purposes and content of specifications; professional conduct, relations, and ethics; and estimating by means of quantity surveys and unit cost methods. Mr. Dawson. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

78. Structural Members. Selected problems in the analysis and design of structural members; such as beams on elastic foundations, curved beams, beam columns, buckling, torsion. Mr. Wang. Prereq.: C.E. 56 and permission of the instructor. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

DAIRY SCIENCE

C. Hilton Boynton, *Professor;* Kenneth S. Morrow, *Professor;* Harry A. Keener, *Professor;* Nicholas F. Colovos, *Professor;* Herbert C. Moore, *Associate Professor;* James B. Holter, *Assistant Professor*

5. Fundamentals of Dairying. A general survey of the dairy industry; the selection, feeding, and management of dairy cattle; the composition and properties of milk and other dairy products; dairy manufacturing processes; market milk. Mr. Morrow and Mr. Moore. 2 lec.; 1 lab.; 3 cr.

30. Dairy Bacteriology. The application of bacteriology principles to the production and processing of milk and other dairy products. Mr. Moore. 2 lec.; 2 lab.; 4 cr.

33. Dairy Products Judging. The various standards and grades of dairy products, with practice in judging milk, butter, cheese, and ice cream. Mr. Moore. 1 lab.; 1 cr.

34. Dairy Cattle Judging. Comparative judging of dairy cattle using animals in the University herd and in nearby herds. Mr. Morrow. 1 lab.; 1 cr.

36. Advanced Dairy Cattle Judging. Continuation of Dairy Science 34. Emphasis on training for participating on dairy cattle judging teams. Mr. Morrow. Prereq.: Dy. Sci. 34. 1 lab.; 1 cr.

60. Dairy Seminar. The literature covering recent research in the various phases of the dairy industry. Students are required to prepare and present oral and written reports on selected topics. Dairy Science staff. 2 lec.; 2 cr.

62. Advanced Dairy Science. Basic data, fundamental observations, and discussions of research contributing to the present status of the dairy industry. Mr. Moore. Prereq.: Adequate preparation in chemistry and bacteriology. 2 lec.; 2 cr.

63. Dairy Cattle. Purebred dairy cattle, breed history, pedigrees; family lines and methods of outstanding breeders; the application of the principles of genetics to the improvement of dairy cattle herd analysis. Mr. Morrow. 2 lec.; 1 lab.; 3 cr.

64. Milk Production. Feeding and management of dairy animals; calf feeding; raising young stock; feeding for economical milk production. Mr. Boynton. 2 lec.; 1 lab.; 3 cr.

65. Market Milk. The producing, handling, and distribution of market milk; dairy farm inspection; control of milk supply. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

66. Ice Cream, Butter, and Cheese. The making, handling, and marketing of ice cream, butter, and cheese. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

DRAMA

(See Speech and Drama)

ECONOMICS

Carroll M. Degler, *Professor;* John A. Hogan, *Professor;* Ruth J. Woodruff, *Professor;* Robert F. Barlow, *Professor;* Sam Rosen, *Associate Professor;* John A. Bergeron, *Assistant Professor;* John A. Bassett, *Instructor*

1-2. Principles of Economics. A study of the principles underlying the organization and operation of the economy. Staff. 3 cr.

3, (3). Economic History of the United States. Historical survey of the development of American business and industry with consideration of credit and trade institutions and of the role of government in the economy. Miss Woodruff. 3 cr.

31-32. Business and Economic Statistics. Methods of collection, analysis, and presentation of statistical data. Statistical techniques as an aid in decision making in business and economics. 3 cr.

52. Public Finance. Problems and policies of expenditure, revenue and debt of federal, state, and local governments. Economic analysis and evaluation of individual types of taxes as well as entire governmental fiscal programs. Critical appraisal of recommended changes in tax systems. Tax problems in the State of New Hampshire. Prereq.: Econ. 2. 3 cr.

53. Money and Banking. The monetary and banking system with reference to monetary standards, value of money, commercial and noncommercial banking, and the structure and policy of the Federal Reserve System. Mr. Degler. Prereq.: Econ. 2. 3 cr.

54. Advanced Money and Banking. A continuation of Economics 53 with emphasis on central banking, monetary policy, and monetary theory. Study of current problems and developments in banking. Mr. Degler. Prereq.: A satisfactory average in Econ. 53 or equivalent. 3 cr.

57. Government Regulation of Business. A study of the role of government in economic affairs, with emphasis upon the regulation of competition and monopoly. Prereq.: Econ. 2. 3 cr.

63. International Trade and Finance. Theory of international trade, foreign exchange, balance of payments, tariffs, and protection. The economic aspects of international relations, with particular reference to recent policies. Prereq.: Econ. 2. 3 cr.

64. Comparative Study of Economic Systems. An examination of socialism, communism, capitalism, and modifications of these economic systems, particularly as exemplified by the Soviet Union, China, Yugoslavia, India, the United Kingdom, and the United States. Miss Woodruff. Prereq.: Econ. 2 or permission of instructor. 3 cr.

66. Economic Development. An analysis of the problems and available solutions confronting the underdeveloped areas of the world. Prereq.: Econ. 2. 3 cr.

71. Trade Unions and Industrial Management. Trade union history, philosophy, and policies. Historical development of management attitudes and the attitudes of law and legislation toward unions. Collective bargaining: its nature, purpose, and public policy considerations. Mr. Hogan. Prereq.: Econ. 2. 3 cr. (Not open to students who have taken Econ. 51.)

72. Labor Economics. Application of the tools of economic analysis to the market for labor. Wage determination and wage policy under union and non-union conditions. The determination of factor shares of the national income with particular emphasis on labor's share. Mr. Hogan. Prereq.: Econ. 2. 3 cr. (Not open to students who have taken Econ. 51.)

73. Intermediate Economic Analysis. Analysis of supply and demand. The determination of prices, production, and the distribution of income in non-competitive situations as well as in the purely competitive model. General equilibrium. Mr. Bergeron. Prereq.: Econ. 2. 3 cr.

74. Mathematical Economics. Application of mathematical techniques to selected problems in economic analysis. Mr. Bergeron. Prereq.: Permission of the instructor. 3 cr.

75. National Income Analysis. Macro-economic measurement, theory, and public policy determination. Prereq.: Econ. 2. 3 cr.

76. Economic Fluctuations. (Business Cycles). Study of recurrent movements of prosperity and depression, with emphasis upon causes and public policy implications. Prereq.: Econ. 2 and one additional semester course in economics or permission of instructor. 3 cr.

79-80. History of Economic Thought. The evolution of economic thought, including the work of contemporary economists. Examination and critical appraisal of the work of major economists and major schools of

economists, particularly with reference to the applicability of their theories to current economic problems. Prereq.: Econ. 2. 3 cr. (Econ. 79 not open to students who have had Econ. 78.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

EDUCATION

EUGENE C. JORGENSEN, *Assistant Professor;* THOMAS O. MARSHALL, *Professor;* WAYNE S. KOCH, *Professor;* EVERETT B. SACKETT, *Professor;* CARLETON P. MENGE, *Associate Professor;* PAUL H. MCINTIRE, *Associate Professor;* PAUL R. LOHNES, *Associate Professor;* ELIZABETH A. HUNTER, *Assistant Professor;* DEBORAH E. STONE, *Instructor;* JOHN D. BARDWELL, *Lecturer*

CARL LUNDHOLM, *Professor* (Physical Education); GEORGE R. THOMAS, *Professor* (Art-Education); WILLIAM H. ANNIS, *Assistant Professor* (Agricultural-Education); MARION C. BECKWITH, *Professor* (Physical Education); DORIS E. TYRRELL, *Associate Professor* (Secretarial Studies-Education); LEWIS C. GOFFE, *Associate Professor* (English- Education); RICHARD H. BALOMENOS, *Assistant Professor* (Mathematics-Education); JOHN B. WHITLOCK, *Associate Professor* (Music-Education); MARJORY A. WYBOURN, *Professor* (Home Economics-Education)

Consultants in Teacher Education

E. HARRY BOOTHBY, ALGER BOURNE, JASON E. BOYNTON, GWENDOLEN E. FLANAGAN, KATHERINE FLANAGAN, GEORGE W. PASICHUKE, JOSEPH J. PETROSKI, MARY W. SAWYER

Staff at Crotched Mountain School for the Deaf

LOUISE CORNELL, *Adjunct Lecturer;* HELEN G. CRATHERN, *Adjunct Lecturer;* ANN THOMPSON HENNESSEY, *Adjunct Lecturer;* MARY ANN JERNIGAN, *Adjunct Instructor;* ROBERT E. KELLY, *Adjunct Assistant Professor;* CAIRBRE MCCANN, *Adjunct Lecturer;* ISABELLE VEZINA, *Adjunct Lecturer*

Cooperating Teachers

IRIA ANDERSON, CAROLYN BARRETT, JOSIE BEAN, GRACE BLANCHARD, ALGER BOURNE, ROBERT BOWEY, JOSEPH BRONSTEIN, ARCHIE BUCK, JOSEPH BURLEIGH, NINA CLARK, ANTHONY CONNEELY, DOROTHY CORMIER, WILLIAM CURRAN, JOAN CURRY, ADELAIDE DODGE, FRANCES DOE, THOMAS DOLAN, MARIE DONAHUE, THOMAS FAWCETT, GWENDOLEN FLANAGAN, RACHEL FRYE, RONALD GALLANT, CARLETON GUPTILL, STILLMAN HOBBS, EUGENE HUNTER, DAVID JOHNSTON, MARY KATKIN, WINNIE KNIGHT, ISABELLE MAGNUSSON, ELIZABETH MCCLAIN, JANET MCFADDEN, BARBARA MILLAR, BENJAMIN MOONEY, JANICE MORTON, CARMITA MURPHY, ELIZABETH NIELSON, JESSIE O'MALLEY, SISTER RAMUNDA, RUTH RAYNES, ALICE ROWE, MARY SAWYER, PAUL SEAVEY, SADIE STEVENS, DOROTHEA STEVENSON, ARLENE STEWART, MARGARET WADDLE, BARBARA WALKER, MARGARET WHALEN, MARY WILLETTE, BRUCE WILSON, BERT WOODMAN

Courses in Education

41, (41). EDUCATIONAL PSYCHOLOGY. An examination of behavior in infancy, childhood, and adolescence with emphasis on the developmental

effects of home and school. This course is a prerequisite to Liberal Arts undergraduate teaching preparation programs. Mr. Menge and Mr. Lohnes. Not open to freshmen. 3 cr.

57, (57). Principles of Learning. Psychology of learning as it operates within the classroom. Prereq.* Mr. Koch, Mr. Menge, and Mr. Lohnes. 3 cr.

58, (58). Principles of Teaching. Application of the theories of learning studied in Education 57, with specific emphasis upon the following: organization of content, specific planning, and a study of procedures essential to the evaluation of the learning processes. Prereq.* Mr. Marshall, Mr. Lohnes, and Mr. Jorgensen. Two 2-hour lec.-labs.; 3 cr.

59, (59). Principles of Education. American schools have developed, and are still developing, in unique forms quite unlike their European counterparts. Among Americans, however, there are basic disagreements concerning the direction our schools should take. This course deals with these conflicts of philosophy, the problems of American education and research pertinent to these problems. Prereq.:* Mr. Marshall. 3 cr.

(63). Instructional Media. To help improve ability to communicate ideas through materials and equipment commonly available in a school audio-visual center. Educational films, bulletin board design, the role of language labs, educational television, programmed learning, and media research will receive particular attention. A laboratory period of one hour each week is required in addition to the regular class period. Mr. Bardwell. Prereq.: Principles of Learning or permission of instructor. 3 cr.

64. Utilization of Testing in Public Education. Strategies for discovering and employing predictive validities of standardized tests in public school work are studied and practiced. Mr. Lohnes. 3 cr.

71-72. Elementary School Teacher Preparation. A block program including observation; psychology of learning; principles of teaching reading, language arts, social studies, mathematics, science, and other elementary school subjects; practice teaching; and a synthesizing seminar. Prereq.* Miss Hunter and Miss Stone. 16 cr. per sem.

---

* The prerequisite for courses in education is permission of the Department, based upon the following.
Ed. 41: Open to any student, sophomore or above.
Ed. 57: Ed. 41 with grade of C or better, cumulative average of 2.2, average of 2.5 in major.
Ed. 58: Same as for Ed. 57 plus a C or better in Ed. 57, a personality suitable for teaching, and a speech test.
Ed. 59. Ed. 57.
Ed. 71-72: Senior standing, completion of all General Liberal Arts requirements, 18 semester hours in a Liberal Arts major subject, personality suitable for teaching, experience working with groups of children, Ed. 41 or Home Ec. 25 with grade of C or better, cumulative average of 2.2.

Courses in Problems in the Teaching of High-School Subjects

The following courses are devoted to a study of problems, objectives, selection and organization of subject matter, teaching and testing techniques, and classroom management in the teaching of the respective subjects.

For details concerning prerequisites and nature of these courses, see descriptions given under respective subject matter departments.

Agricultural Education (Ag. Ed.) 88. Principles of Agricultural Education. Mr. Annis. 3 lec.; 3 cr.

Agricultural Education (Ag. Ed.) 89-90. Methods of Teaching Farm Mechanics in Vocational Agriculture. Mr. Gilman. 1 lab.; 1 cr.

Agricultural Education (Ag. Ed.) 91. Planning for Teaching. Mr. Annis. 4 cr.

Art-Education (Art-Ed) 91. Problems of Teaching Art in Elementary Schools. Mr. Thomas. 3 cr.

Art-Education (Art-Ed) (92). Problems of Teaching Art in Secondary Schools. Mr. Thomas. 3 cr.

Biology-Education (Biol-Ed) 91. Problems in the Teaching of High-School Biology. Mr. Schaefer. 3 cr.

English-Education (Engl-Ed) 91. Problems in the Teaching of High-School English. Mr. Goffe. 3 cr.

History-Education (Hist-Ed) 91. Problems in the Teaching of High-School History and Other Social Studies. 3 cr.

Home Economics-Education (HE-Ed) 91. Problems in the Teaching of High-School Home Economics. Miss Wybourn. 3 cr.

Languages-Education (Lang-Ed) 91. Problems in the Teaching of Modern Langhages in the High-School. Mr. Chasse. 3 cr.

Mathematics-Education (Math-Ed) 91. Problems in the Teaching of High-School Mathematics. Mr. Balomenos. 3 cr.

Music-Education (Mu-Ed) 90. Problems in the Teaching of Elementary School Music. Mr. Whitlock. 3 cr.

Music-Education (Mu-Ed) 93. Problems in the Teaching of Secondary School Music. Mr. Whitlock. 3 cr.

Physical Education-Education (PE-Ed) 91. Problems in the Teaching of Physical Education for Women. Miss Newman. 3 cr.

Courses in Supervised Teaching

This work is required in the Teacher Preparation program. It is open only to students whose applications are approved by the Chairman of the Department of Education and the Coordinators of Student Teaching in the

subject or subjects in which the applicant desires to do supervised teaching. *Applications should be filed in the office of the Department of Education on or before November 15 of the academic year in which the supervised teaching is to be done.*

Students may be enrolled for from 6 to 14 credits* of work in Supervised Teaching, usually in the second semester of the senior year. Students registered in the College of Liberal Arts may count no more than 9 semester credits in Supervised Teaching toward the fulfillment of the major requirements in Education. Prerequisites for the Ed. 94 courses are listed in the footnote.†

EDUCATION-AGRICULTURE (ED-AG) 93. SUPERVISED TEACHING IN VOCATIONAL AGRICULTURE. Prereq.: Senior standing in Agricultural Education curriculum.

EDUCATION-ART (ED-ART) 94. SUPERVISED TEACHING IN ART.

EDUCATION-BIOLOGY (ED-BIOL) 93, 94. SUPERVISED TEACHING IN HIGH-SCHOOL BIOLOGY.

EDUCATION-COMMERCE (ED-CS) 94. SUPERVISED TEACHING IN HIGH-SCHOOL COMMERCIAL SUBJECTS.

EDUCATION-ELEMENTARY (ED-EL) 94. SUPERVISED TEACHING IN THE ELEMENTARY SCHOOL.

EDUCATION-ENGLISH (ED-ENGL) 94. SUPERVISED TEACHING IN HIGH-SCHOOL ENGLISH.

EDUCATION-GENERAL SCIENCE (ED-GS) 94. SUPERVISED TEACHING IN HIGH-SCHOOL GENERAL SCIENCE.

EDUCATION-HISTORY (ED-HIST) 94. SUPERVISED TEACHING IN HIGH-SCHOOL HISTORY AND OTHER SOCIAL STUDIES.

EDUCATION-HOME ECONOMICS (ED-HE) 94. SUPERVISED TEACHING IN HIGH-SCHOOL HOME ECONOMICS.

EDUCATION-LANGUAGE (ED-LANG) 94. SUPERVISED TEACHING IN HIGH-SCHOOL MODERN FOREIGN LANGUAGE.

EDUCATION-LATIN (ED-LAT) 94. SUPERVISED TEACHING IN HIGH-SCHOOL LATIN.

EDUCATION-MATHEMATICS (ED-MATH) 94. SUPERVISED TEACHING IN HIGH-SCHOOL MATHEMATICS.

EDUCATION-MUSIC (ED-MU) 93, 94. SUPERVISED TEACHING IN ELEMENTARY AND SECONDARY SCHOOL MUSIC.

EDUCATION-PHYSICAL EDUCATION (ED-PE) (92), 92. DIRECTED TEACHING OF PHYSICAL EDUCATION FOR WOMEN. Prereq.: PE-ED 91 or concurrently. 1 lec.; 2 5-hr. lab.; 6 cr.

---

* Except Ed.-Ag. 93 wherein the credits are 17 and in Ed.-H.E. 94 wherein they are 7.

† The prerequisite for Ed. 94 is the same as for Ed. 58 plus a C or better in a 91 course (if offered), at least 18 semester hours in the subject to be taught, plus approval based upon selection processed by both the student's major department and the Department of Education.

Education-Physical Education (Ed-PE) 93, (93). Directed Teaching in Physical Education for Men. Prereq.: Zool. 17-18; P. E. 23 and 61. The student must have completed the methods course in the sport which he is directing or take the course concurrently. 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ELECTRICAL ENGINEERING

Alden L. Winn, *Professor;* Leon W. Hitchcock, *Professor Emeritus;* William B. Nulsen, *Professor;* Robert N. Faiman, *Professor;* John B. Hraba, *Professor;* Albert D. Frost, *Professor;* Fletcher A. Blanchard, *Associate Professor;* Joseph B. Murdoch, *Associate Professor;* Donald W. Melvin, *Assistant Professor;* Ronald R. Clark, *Assistant Professor;* Robert W. Goodrich, *Assistant Professor;* Chester W. Stanhope, *Instructor;* David W. Knudsen, *Instructor*

1-2. Electrical Engineering. The fundamental physical laws and concepts of electrical engineering and their application to circuits, electric and magnetic fields, instrumentation, and direct-current machinery. Prereq.: Math. 23 or 26 taken concurrently and Phys. 18. E.E. 1: 1 lec.; 1 rec.; 1 lab. or conf.; 3 cr. E.E. 2: 1 lec.; 2 rec.; 1 lab.; 4 cr.

3-4. Applied Electromagnetics. Electric and magnetic circuits, vector diagrams, and equivalent circuits as applied to transformers, synchronous, and asynchronous machines. Prereq.: E.E. 2, Math. 22. Required of juniors in Electrical Engineering. 3 rec.; 3 cr.

5. Circuit Theory. Single phase and polyphase circuits, network theorems and wave analysis. Prereq.: E.E. 2. Required of juniors in Electrical Engineering. 3 lec.; 3 cr.

9. Physical Electronics. Electron ballistics, conduction in gases, vacuum, metals, and semiconductors; theory of emission; theory of operation, characteristic curves, and equivalent circuits for electron devices such as vacuum and gas tubes, solid state rectifiers, and transistors. Prereq.: E.E. 5 taken concurrently. Required of juniors in Electrical Engineering. 3 lec.; 3 cr.

10. Electronic Circuits. Theory of operation, analysis, and design of active circuits containing electron devices. Prereq.: E.E. 9. Required of juniors in Electrical Engineering. 3 lec.; 3 cr.

14. Electronics Laboratory. Experimental investigations in the principles of electrical engineering as applied to electronic devices, circuits, and instrumentation. Prereq.: E.E. 10 taken concurrently. Required of juniors in Electrical Engineering. 1 lab.; 1 cr.

15, 16, 17, 18. Student Branch IEEE. A student-conducted organization, operated under the by-laws of the institutes, designed to introduce the student to professional society activities. Approximately 10 to 12 meetings are scheduled during the year, usually in the evenings. These meetings provide lectures by industrial representatives, inspection trips, and attendance at state and regional meetings. Each student is required to become a student member of IEEE with annual dues of $5.00 per year. Required of juniors and seniors in Electrical Engineering. No credits.

23, 24. Electrical Laboratory. Experimental investigations in the principles of electrical engineering as applied to direct and alternating current machines. Laboratory procedures and presentation of engineering reports. Prereq.: E.E. 2. Required of juniors in Electrical Engineering. 1 lab.; 2 cr.

25, 26. Electrical Laboratory. Experimental investigations in the principles of electrical engineering as applied to electrical engineering systems, devices and components. Formal reports are required. Prereq.: E.E. 4, E.E. 10. Required of seniors in Electrical Engineering. 1 lab.; 2 cr.

33. Fundamentals of Electrical Engineering. Direct and alternating current circuits, instruments and machines, and rectifiers and transformers. Prereq.: Physics 24. Required of juniors in Agricultural, Chemical, and Civil Engineering. 3 lec.; 1 lab.; 4 cr.

39. Electrical Engineering Fundamentals. Electric and magnetic fields and circuits. Prereq.: Physics 24. Required of juniors in Mechanical Engineering. 3 lec.; 1 lab.; 4 cr.

40. Circuits, Machinery, and Control. Continuation of electric circuits. Applications of electrical engineering to machines and systems. Prereq.: E.E. 39. Required of juniors in Mechanical Engineering. 3 lec.; 1 lab.; 4 cr.

41. Electronic Fundamentals. Physical electronics, electronic circuits with emphasis on instrumentation. Prereq.: E.E. 33 or 39. Required of seniors in Mechanical Engineering. 2 lec.; 1 lab.; 3 cr.

45. Transmission Lines and Network. Transmission line fundamentals, T and Pi sections, filters, and symmetrical components. Prereq.: E.E. 5. Required of seniors in Electrical Engineering. 3 lec.; 3 cr.

46. Electric Fields. Static electric and magnetic fields, electromagnetic fields, Maxwell's equations, wave equations, plane waves. Prereq.: E.E. 2, Math. 24. Required of seniors in Electrical Engineering. 3 lec.; 3 cr.

52. Industrial Electronics Fundamentals. Application of electronics to industrial processes. Prereq.: E.E. 41. Limited to students not registered in the Electrical Engineering curriculum. 2 lec.; 1 lab.; 3 cr.

58. Electronic Systems Analysis and Design. Techniques in coding, storage, and transfer of information. Analysis and design of electronic systems. Prereq.: Permission of instructor. 3 lec.; 3 cr.

60. Advanced Circuit Theory. Steady state and transient analysis, derivation of fundamental formulas and constants; application of LaPlace transforms. Prereq.: Permission of instructor. 3 lec.; 1 conf.; 4 cr.; when offered without conference period, 3 cr.

62. Illumination. Radiation, fundamental processes in gases, atomic spectra, sources of visible and near visible energy, lamp circuitry, lighting and wiring design, control of light, photometry, and color. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

70, (70). Electrical Engineering Projects. A laboratory or advanced study course. Each student will either join one of the department research projects or engage in a project which is in one of the following areas of current staff interest: Acoustics and Electronic Systems (Mr. Frost), Control Systems (Mr. Blanchard, Mr. Clark), Illumination (Mr. Murdoch), Magnetic Amplifiers (Mr. Melvin), Non-linear Analysis (Mr. Hraba), Semi-

conductors (Mr. Winn), and Transient Analysis (Mr. Nulsen). Admission to the course will be limited to those accepted by a staff member. 1-4 conf. or 1-2 lab.; 1-4 cr.

78. Industrial Electronics. Analysis and design of equipment for the measurement, instrumentation, and control of industrial processes; introductory theory of closed loop systems. Prereq.: Permission of the instructor. 3 lec.; 1 lab.; 4 cr.

80, (80). Engineering Analysis. The basic principles and analytical methods employed in the solution of complex problems in the various branches of engineering. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

82. Control Systems. Fundamental principles involved in the design and analysis of feedback control systems. Prereq.: Permission of the instructor. 3 lec.; 3 cr.; or 3 lec. and 1 lab.; 4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ENGLISH

Sylvester H. Bingham, *Professor;* William G. Hennessy, *Professor Emeritus;* Robert G. Webster, *Professor;* J. Howard Schultz, *Professor;* Dale S. Underwood, *Professor;* Lucinda P. Smith, *Associate Professor Emerita;* G. Harris Daggett, *Associate Professor;* Max S. Maynard, *Associate Professor;* John C. Richardson, *Associate Professor;* Lewis C. Goffe, *Associate Professor;* Edmund G. Miller, *Associate Professor;* Philip L. Nicoloff, *Assistant Professor;* Thomas A. Williams, Jr., *Assistant Professor;* Eugene N. Yarrington, *Assistant Professor;* S. Anthony Caldwell, *Instructor;* Lee S. Baier, *Instructor;* Douglas L. Zweizig, *Instructor;* Diane Fortuna, *Instructor;* Lawson Inada, *Instructor;* Gordan A. Lameyer, *Instructor;* Hugh M. Potter, *Instructor;* John A. Yount, *Instructor;* Harvey S. Zuckerman, *Instructor*

C. Improvement in Reading. Intensive drill in reading skills for six weeks. 3 rec.; no credit.

1-2, (2), (1). Freshman English. Training to write more correctly and with more force and to read with more appreciation and discernment the chief types of literature. The staff of the department under the chairmanship of Mr. Baier. 3 cr. *No credit toward a major.*

12. The Bible as Literature. The various literary types found in the Bible and a survey of the influence of the Bible on English literature. Mr. Schultz. Prereq.: Engl. 1-2. 3 cr. (Alternate years; offered in 1963-64.)

13, 14. An Introduction to English Literature. The development of English literature from its beginning to the 20th century by means of selected readings. Mr. Richardson, Mr. Miller, Mr. Yarrington, Mr. Lameyer. Prereq.: Engl. 1-2. 3 cr. *No credit toward a literature major.*

15, 16. A Survey of American Literature. Mr. Webster, Mr. Daggett, Mr. Goffe, and Mr. Nicoloff. Prereq.: Engl. 1-2. 3 cr. *No credit toward a literature major.*

21-22. Elements of News Writing and Reporting. Mr. Murray. Prereq.: Engl. 1-2. 3 cr. *No credit toward a literature major.*

23, (23). Writing of Technical Reports. Mr. Webster, Mr. Caldwell, and Mr. Yount. Required of seniors in Agriculture and in Mechanical, Electrical, and Civil Engineering. 2 cr.

25-26. Advanced Composition. Practice with compositions of varying lengths. Class discussions with illustrative readings. Weekly conferences. Mr. Williams and Mr. Yount. Prereq.: Engl. 1-2. 3 cr. *No credit toward a literature major.*

52. Magazine Article Writing. Mr. Murray. Prereq.: Engl. 1-2. 3 cr. *No credit toward a literature major.*

53, 54. Writing as an Art. The study and practice of forms of writing, together with an examination of the history of literary philosophy. Practice in mutual criticism through class workshop discussions and written comment. Freedom in selection and pursuance of writing interests. Individual conferences. Mr. Williams. Prereq.: Engl. 25 or its equivalent. 3 cr. (Alternate years; not offered in 1963-64.) *No credit toward a literature major.*

55, 56. Chaucer. Mr. Underwood. 3 cr.

57, 58. Shakespeare's Plays. The major histories, comedies, and tragedies. Mr. Schultz and Mr. Yarrington. 3 cr.

59. Milton. Mr. Schultz. 3 cr. (Alternate years; offered 1963-64.)

60. Boswell's Johnson. Mr. Maynard. 3 cr. (Not offered 1963-64.)

61. Wordsworth. Mr. Miller. 3 cr. (Alternate years; not offered 1963-64.)

62. Browning. Mr. Daggett. 3 lec.; 3 cr. (Alternate years; offered in 1963-64.)

63, 64. English Literature in the Sixteenth Century. Mr. Schultz. 3 cr. (Alternate years; offered second semester only, 1964.)

65, 66. English Literature in the Seventeenth Century. Mr. Lameyer. 3 cr. (Alternate years; not offered 1963-64.)

67, 68. English Literature in the Eighteenth Century. Mr. Maynard. 3 cr. (Alternate years; offered 1963-64.)

69, 70. The English Romantic Period. Wordsworth, Coleridge, Lamb, Hazlitt, Byron, Shelley, DeQuincey, Keats. Mr. Miller. 3 cr. (Alternate years; offered 1963-64.)

71, 72. Victorian Prose and Poetry. Major non-fictional prose from Carlyle to Stevenson and major poetry from Tennyson to Hardy. Mr. Miller. 3 cr. (Alternate years; not offered 1963-64.)

73, 74. British Literature of the Twentieth Century. Mr. Richardson. 3 cr. (Alternate years; not offered 1963-64.)

75. New England Renaissance. Emerson, Thoreau, and other transcendentalists. Mr. Daggett. 3 cr. (Alternate years; not offered 1963-64.)

76. American Novel in the Nineteenth Century. Mr. Webster. 3 cr. (Alternate years; not offered 1963-64.)

77. American Poetry of the Nineteenth Century. Mr. Daggett. 3 cr. (Alternate years; offered 1963-64.)

79, 80. American Literature of the Twentieth Century. Mr. Nicoloff. 3 cr. (Alternate years; offered 1963-64.)

81, 82. Introduction to English Drama. The development of English drama, exclusive of Shakespeare, from the Middle Ages to the present. Mr. Yarrington. 3 cr. (Alternate years; offered 1963-64.)

83, 84. The English Novel of the Eighteenth and Nineteenth Centuries. Mr. Bingham and Mr. Miller. 3 cr.

85. Expository Writing. Mr. Yount. Prereq.: Engl. 1-2. Limited to students in the teacher preparation program and graduate students working for the M.S.T. degree. 3 cr. *No credit toward a literature major.*

86. English Grammar. Mr. Goffe. Prereq.: English 1-2. Limited to students in the teacher preparation program and graduate students working for the M.S.T. degree. (Not open to students who have had English 27.) 3 cr. *No credit toward a literature major.*

87, 88, 89. Critical Analysis. Analysis of three forms of writing: 87, Exposition; 88, Fiction; 89, Poetry. Mr. Bingham and Mr. Richardson. Prereq.: Engl. 1-2. (Not open to students who have had English 43, 44, 45.) 3 cr. *No credit toward a literature major.*

English-Education. (Engl.-Ed) 91. Problems in the Teaching of High-School English. Principles and methods of teaching literature and composition in secondary schools. For all students who plan to teach English in secondary schools, and for all students majoring in Language, History, or Education. Mr. Goffe. Prereq.: A grade of C or better in Educ. 58. Literature majors in English by permission of the instructor; all other students by fulfillment of the following: Engl. 13, 14; 16; 25; 87, 88, 89; one semester of Engl. 57, 58; a demonstration of skill in the use of English grammar, either by the satisfactory completion of Engl. 86 or by examination. 3 cr. *No credit toward a literature major.*

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ENTOMOLOGY

James G. Conklin, *Professor;* Walter C. O'Kane, *Professor Emeritus;* Robert L. Blickle, *Professor;* William R. Lee, *Assistant Professor*

(2), 2. Introductory Entomology. An introduction to entomology in its broad aspects. The structure, biology, and classification of insects. This course should be particularly useful to students contemplating a major in the field of biology-education. Each student electing the laboratory work is required to make an insect collection. Students in the College of Technology may be permitted to elect the lectures only. Mr. Conklin. 2 lec.; 1 lab.; or 2 lec.; 2-3 cr.

46. Forest Entomology. Structure and development of insects. Orders and families of insects of importance to foresters. Principles of insect control. Biology and control of representative forest insects. Each student is

required to make an insect collection. Adapted especially for Forestry majors. Open to any student. Mr. Conklin. 2 lec.; 1 lab.; 3 cr.

48. Biology of Social Bees. Behavior and life history of the social bees with emphasis on the use of communication to coordinate colony activities. Students interested in beekeeping should arrange for a special problem in the University Apiary by electing Ent. 59 or 60 in addition to taking this course. Mr. Lee. 2 cr.

54. Medical Entomology. Insects and arachnids in relation to public health. The more important disease carriers, their biologies, and means of control. Adapted especially for students interested in public health or medicine. Mr. Blickle. Elective for juniors and seniors. 2 lec.; 1 lab.; 3 cr.

57-58. Advanced Entomology. The anatomy and physiology of insects. Systematic entomology. Mr. Conklin, Mr. Blickle, Mr. Lee. Open to others than Entomology majors by permission of the Department Chairman. 2 lec.; 2 lab.; 4 cr.

59, 60. Advanced Economic Entomology. Problems in applied entomology and apiculture; the literature of economic entomology; investigational methods; studies of the specialized phases of entomology. Mr. Conklin, Mr. Blickle, Mr. Lee. Required of Entomology majors. Open to others than Entomology majors by permission of the Department Chairman. 1 to 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FOREIGN LANGUAGES AND LITERATURES

R. Alberto Casas, *Professor;* Clifford S. Parker, *Professor Emeritus;* John S. Walsh, *Professor Emeritus;* Louis J. Hudon, *Professor;* Hermann W. Reske, *Associate Professor;* Alexander P. Danoff, *Assistant Professor;* Ralph H. Cryesky, *Assistant Professor;* Charles H. Leighton, *Assistant Professor;* Nicholas E. Alssen, *Assistant Professor;* David A. Collins, *Instructor;* Paul Chasse, *Instructor;* George Doig, *Instructor;* Humberto Lopez-Morales, *Instructor;* Christiane Musinsky, *Instructor;* Edna S. Hudon, *Lecturer;* Hilda S. Reske, *Lecturer*

General Language and Literature

Register for the following courses as Lang. 1, etc.

1, 2. Survey of Greek and Roman Literature. The masterpieces of Greek and Roman literature in translation. Through the study of literature, the students will learn about the ancient civilization from which much of our contemporary culture has come. A cultural course for the student unprepared to read the original languages but desiring acquaintance with the subject matter. A background course for majors in such subjects as English, History, Latin, or the modern languages and literatures. Mr. Doig. *Not open to freshmen.* 3 cr. *No credit toward a major.*

51, 52. Survey of Modern European Literature. The Renaissance, classicism, romanticism and realism studied as international movements. Stress is not upon the details of each national literature, but upon the interdependence of the literatures of the various countries. Conducted in English. 3 cr.

73. Introduction to Romance Philology. The historical development of French and Spanish from Vulgar Latin, phonology, morphology, syntax, semantics, etymology. Frequent reference is made to the spoken languages of today as well as to comparative semantics. Mr. Cryesky. Prereq.: One year of Latin and familiarity with two Romance Languages. 3 cr. (Alternate years; not offered 1963-64.)

Language-Education (Lang-Ed) 91. Problems in the Teaching of Modern Languages in the High School. The special objectives, methods, and devices of modern language teaching in high school. For prospective teachers of French, German and Spanish. Prereq.: Education 58 with grade of C or better (or one year of teaching experience) and one of the following courses: French 6, German 6, Spanish 6. 3 lec.; 3 cr.

FRENCH

Register for the following courses as Fr. 1, etc.

New students will be assigned to French 1, French 2, French 3, French 4, or French 5 on the basis of their performance in the French placement examination.

*1-2. Elementary French. For students without previous knowledge of French. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. (*Students who offer two entrance units or two years of high school work in French, and who do not qualify for French 3 will not be permitted to register for credit for French 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, French 2.*)

3-4. Intermediate French. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in French. 3 rec.; 1 lab.; 3 cr. *No credit toward a major. Open by placement examination, and to students who have passed French 2 with a grade of C. Students making a grade of A in French 4 may take courses numbered 50 and above with the permission of the department.*

5-6. Introduction to French Literature and Thought. Reading and analysis of significant works in French literature and thought. Organized around such topics as "The individual and society", "Social criticism", etc. Outside readings on the historical and cultural background of the works read. Papers and discussion in French. Term paper in English. 3 cr. *This course or its equivalent prerequisite to all higher courses in French. Open to students who have achieved a grade of A or B in French 2 by permission of the department, to students who have achieved a grade of C or better in French 4, and by placement examination.*

12. French Grammar. Thorough study of the structure of the French language. 2 cr. *No credit toward a major.* Prereq.: *French 6 but it may be taken concurrently with French 6.*

---

* The content of French 1 is equivalent to Elementary French 1-2 and French 2 is equivalent to French 3-4 under the former 3-credit system.

No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

41. Early French Literature. French literature of the Middle Ages and the Renaissance in modern French adaptation where necessary. Background readings in history and culture. Conducted in French. Prereq.: French 6. 3 cr.

59-60. French Literature of the Seventeenth Century. 59: Historical and literary background of French Classicism, poetry, Corneille, Pascal, and Molière's early plays. 60: Molière, Racine, La Fontaine, Mme. de La Fayette, Boileau, and La Bruyère, Lesage, the beginning of the philosophical movement. Mr. Hudon. Conducted in French. Prereq.: French 6. 3 cr. (Not offered in 1963-64.)

64. Eighteenth Century French Literature and Thought. The literary and philosophical currents, including Montesquieu, Marivaux, Rousseau, Voltaire, the *encyclopedistes,* Beaumarchais and others. Conducted in French. Prereq.: French 6. 3 cr. (Not offered 1963-64.)

67-68. Nineteenth Century French Literature. 67: Romanticism; Mme. de Stael, Chateaubriand, Lamartine, Hugo, Vighy, Musset. 68: Late Romanticism; Realism; Stendhal, Balzac, Flaubert; Hugo, the Parnassian school. Conducted in French. Prereq.: French 6. 3 cr.

70. Introduction to Modern French Poetry. Baudelaire, Rimbaud, Mallarmé, Valéry and others. Prereq.: French 6. 3 cr.

73, 74, 75, 76. Special Studies in French Language and Literature. Individual guided study in special topics, with training in bibliography and organization of material. Examples of topics which may be selected are (a) the work of a major French author, (b) specific topics in any area of French literature, such as literary criticism in the Seventeenth Century. The Staff. Prereq.: Permission of the Chairman of the Department. 3 cr.

81-82. Contemporary French Novel and Theater. 81: Zola, the Goncourts, Proust, Gide, Becque, Maeterlinck, and others. 82: Mauriac, Malraux, Bernanos, Sartre, Camus, Claudel, Cocteau, Pagnol, Anouilh, Giraudoux and others. Conducted in French. Prereq.: French 6. 3 cr. (Not offered 1963-64.)

90. Advanced Language and Style. Translation of literary texts, intensive study of the principal techniques of style, *explication de textes.* Open to qualified students who have had a minimum of six hours of French courses numbered 41 and above. 3 cr.

German

Register for the following courses as Ger. 1, etc.

New students will be assigned to German 1, German 2, German 3, German 4, or German 5, on the basis of their scores on the German placement examination.

*1-2. Elementary German. For students without previous knowledge of German. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command

* The content of German 1 is equivalent to Elementary German 1-2 and German 2 is equivalent to German 3-4 under the former 3-credit system.
No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. *(Students who offer two entrance units or two years of high school work in German and who do not qualify for German 3 will not be permitted to register for credit for German 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, German 2.)*

3-4. Intermediate German. Formal review of the structure of the language, further training in spoken and written German, intensive reading of selected literary texts. Outside readings in special fields of interest. 3 rec.; 1 lab.; 3 cr. *Open by placement examination, and to students who have passed German 2 with a grade of C. Students making a grade of A in German 4 may take courses numbered 50 and above with the permission of the department.*

5-6. Introduction to German Literature. Reading and analysis of works selected from the most important periods in German literature. Outside readings on the historical and cultural background of the works read. Papers and discussion in German. Term paper in English. 3 cr. *This course or its equivalent prerequisite to all higher courses in German. Open to students who have achieved a grade of A or B in German 2 by permission of the department, to students who have achieved a grade of C or better in German 4, and by placement examination.*

59. German Literature of the Age of the Baroque and Enlightenment. A survey of German literature between Reformation and the Age of Goethe. Reading, interpretation, and critical analysis of prescribed prose, drama and poetry. Mr. Reske. Prereq.: German 6. 3 cr. (Offered 1963-64.)

62, 63. The Age of Goethe. German literature of Storm and Stress and the Classical Period. Interpretation and critical analysis with emphasis upon selected works of Lenz, Klinger, Schiller and Goethe. Mr. Reske. Prereq.: German 6. 3 cr. (Offered 1963-64.)

64. German Romanticism. Interpretation and critical analysis of prescribed prose, drama and poetry of Kleist, Novalis, Tieck, Schlegel, Brentano, Eichendorff. Prereq.: German 6. 3 cr. (Offered 1964-65.)

65. German Realism. German literature from the end of Romanticism to Naturalism, with presentation of the social and philosophical development of the period (1830-1880). Prereq.: German 6. 3 cr. (Offered 1965-66.)

66, 67. German Literature Since 1880. From Naturalism to the present. Reading, interpretation, and critical analysis of prescribed prose, drama, and poetry of Hauptmann, Hofmannstal, Rilke, Mann, Kafka. Prereq.: German 6. 3 cr. (Offered 1964-65.)

73, 74, 75, 76. Special Studies in German Literature. Independent guided study in special topics, with training in research techniques. Examples of topics which may be selected by instructor and student in conference are: (1) Middle High German Popular Epics; (2) German Literature of the 17th century; (3) Goethe's Poetry; (4) Goethe's Faust; (5) Heinrich v. Kleist; (6) German Romanticism; (7) 20th Century German Literature. Prereq.: Permission of Chairman of the department. 3 cr.

90. Advanced Stylistics. A systematic study of style, shades of meaning, adequacy of expression. A thorough knowledge of German grammar is prerequisite. Practice in writing seminar papers, and obtaining stylistic flexibility in the use of written German. Prereq.: German 5-6. 3 cr.

Greek

Register for the following courses as Gr. 1, etc.

1-2. Elementary Greek. Grammar, composition translation. Mr. Doig. Prereq.: Permission of the instructor. 3 cr. *No credit toward a major.*

3-4. Intermediate Greek. Translation of several books of Homer's *Iliad;* work in grammar and word derivation. Mr. Doig. Prereq.: Gr. 2. 3 cr.

Italian

Register for the following as Ital. 1, etc.

1-2. Elementary Italian. Elements of Italian grammar, reading of simple prose, oral practice. 3 cr. *No credit toward a major.* (Offered in Extension.)

Latin

Register for the following courses as Lat. 1, etc.

New students will be assigned to Latin 1, Latin 3, or Latin 5 on the basis of their scores on the Latin placement examination.

1-2. Elementary Latin. Elements of grammar, reading of simple prose. The changes in meaning and form of English and Romance language derivatives from Latin. 3 cr. *(Students who offer two entrance units [two years of high-school work] in a language will not be permitted to register for the first semester of that elementary language course for credit. They may, however, audit the course with proper authorization.) No credit toward a major.*

3-4. Intermediate Latin. A review of Latin grammar and vocabulary, followed by readings in prose and poetry. Prereq.: Lat. 2 or the equivalent. Mr. Doig. 3 cr.

5-6. Latin Prose and Poetry. Selections from Livy, Catullus, Ovid, Phaedrus, Martial, and the odes of Horace. Translation, lectures, and study of the influence of Latin on English poetry. Mr. Doig. Prereq.: Lat. 4 or equivalent. 3 cr.

53-54. The Historians. Livy, Suetonius, and Tacitus in selected works. Illustrated lectures and outside readings on the historical, social, and political background of Rome essential to the student or teacher of Latin. Mr. Doig. Prereq.: Lat. 6 or equivalent. 3 cr. (Alternate years; not offered 1963-64.)

55-56. The Golden Age. Roman literature of the classical period, particularly the work of Caesar, Cicero, and Virgil. Prereq.: Lat. 6 or its equivalent. Mr. Doig. 3 cr. (Alternate years; offered 1963-64.)

71, 72, 73, 74. Special Studies in Latin Literature. Guided studies in special topics with training in bibliography and organization of material. Examples of topics which may be selected by instructor and student are: (a) Roman Comedy and Elegy, (b) The Roman Epic, (c) Roman Drama, (d) The Silver Age. Mr. Doig. Prereq.: Permission of the Chairman of the Department. 3 cr.

Russian

Register for the following as Ru. 1, etc.

*1-2. Elementary Russian. Elements of Russian grammar, reading of graded prose, and oral use of the language. Mr. Alssen. 3 cr. *(Students who offer two entrance units [two years of high-school work] in a language will not be permitted to register for the first semester of that elementary language course for credit. They may, however, audit the course with proper authorization.) No credit toward a major.*

3-4. Intermediate Russian. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in Russian. Mr. Alssen. 1 lab.; 3 cr. *Open by placement examination, and to students who have passed Russian 2 with a grade of C.*

5-6. Russian Literature and Thought. Reading and analysis of significant works in Russian literature and thought. Outside readings on the historical and cultural background of the works read. Papers and discussion in Russian. Term paper in English. Mr. Alssen. 3 cr. *This course or its equivalent prerequisite to all higher courses in Russian. Open to students who have achieved a grade of A or B in Russian 2 by permission of the department, to students who have achieved a grade of C or better in Russian 4, and by placement examination.*

Spanish

Register for the following courses as Sp. 1, etc.

New students will be assigned to Spanish 1, Spanish 2, Spanish 3, Spanish 4, or Spanish 5, on the basis of their scores on the Spanish placement examinations.

*1-2. Elementary Spanish. For students without previous knowledge of Spanish. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. *(Students who offer two entrance units or two years of high school work in Spanish, and who do not qualify for Spanish 3 will not be permitted to register for credit for Spanish 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, Spanish 2.)*

3-4. Intermediate Spanish. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in Spanish. 3 rec.; 1 lab.; 3 cr. *Open by placement examination, and to students who have passed Spanish 2 with a grade of C. Students making a grade of A in Spanish 4 may take courses numbered 50 and above with the permission of the department.*

---

* No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

* The content of Spanish 1 is equivalent to Spanish 1-2 and Spanish 2 is equivalent to Spanish 3-4 under the former 3-credit system.

No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

5-6. Introduction to Spanish Literature and Thought. Reading and analysis of significant works in Spanish literature and thought. Organized around such topics as "Self and society", "God and man", "Order and change in society", etc. Outside readings on the historical and cultural background of the works read. Papers and discussion in Spanish. Term paper in English. Mr. Leighton. 3 cr. *This course or its equivalent prerequisite to all higher courses in Spanish. Open to students who have achieved a grade of A or B in Spanish 2 by permission of the department, to students who have achieved a grade of C or better in Spanish 4, and by placement examination.*

31, 32. Advanced Spanish Conversation and Composition. For students who wish to perfect their command of written and spoken Spanish, maintain aural-oral fluency in Spanish through intensive work in and out of the classroom, individual conferences, and laboratory sessions. Prereq.: Span. 3 or 4 or equivalent. 3 lec.; 2 ½-hr. lab.; 3 cr. (Not offered 1963-64.)

51. Spanish Literature up to 1600 and Cervantes. Readings and discussion of the great human creations of early Spanish literature such as El Poema del Mio Cid, El Libro de Buen Amor, La Celestina and Don Quijote, and their social and historical background. The first part covers early Spanish literature up to Cervantes. The second part is devoted entirely to Cervantes: his life, drama, Novelas Ejemplares, and his masterpiece Don Quijote. Prereq.: Sp. 5 or equivalent. 3 cr. (Not offered 1963-64.)

52. Drama and Poetry of the Siglo de Oro. The social background of the baroque period. Readings of the representative plays of Lope de Vega, Calderon, Alarcon, Tirso de Molina, and the poetry of Gongora and Quevedo. Development of the prose of the period. Mr. Lopez-Morales. Prereq.: Sp. 5 or equivalent. 3 cr.

55. Literature of the Nineteenth Century. Preliminary survey of the eighteenth century and readings and discussion of the main literary movements and writers of the nineteenth century such as Quintana, Espronceda, Zorrilla, Larra, Duque de Rivas, Becquer, Perez Galdos, Valera, Pereda, Clarin, and Echegaray. Social and historical background of Spain in relation to nineteenth century thought in Europe. Mr. Casas. Prereq.: Sp. 6 or equivalent. 3 cr.

56. Contemporary Spanish Literature. Starting with the generation of 1898 this course covers the readings and discussion of the work of such writers as Unamuno, Azorin, Baroja, Machado, J. R. Jimenez, Ortega y Gasset, Garcia Lorca, Perez de Ayala, Casona, Benavente, and a survey of Spanish literature and thought since 1939. Mr. Casas. Prereq.: Sp. 6 or equivalent. 3 cr.

65, 66. Spanish-American Literature. The main themes of Spanish-American literature through the reading of the works of the most representative authors along with an historical, social and geographical background of the New World. Mr. Lopez-Morales. Prereq.: Sp. 6 or equivalent. 3 cr. (Not offered 1963-64.)

73, 74, 75, 76. Special Studies in Spanish and Literature. Individual guided study in special topics, with training in bibliography and organization of material. Examples of topics that may be selected by instructor and student in conference are: (a) 18th, 19th or 20th century literature in Spain; (b) literature and civilization in Spain in the Golden Age; (c) Cervantes;

(d) the literature of individual Latin-American countries. The Staff. Prereq.: Permission of the Chairman of the Department. 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FORESTRY

PAUL E. BRUNS, *Professor;* CLARK L. STEVENS, *Professor;* LEWIS C. SWAIN, *Professor;* OLIVER P. WALLACE, *Associate Professor;* HAROLD W. HOCKER, JR., *Associate Professor;* PETER H. ALLEN, *Assistant Professor;* JAMES P. BARRETT, *Assistant Professor*

General Courses

1. FORESTRY PRINCIPLES. Fundamentals of forestry as applied to the orderly handling of woodlands. Mr. Swain. Elective for all students, except Forestry majors. 2 lec.; 1 lab.; 3 cr.

38. NATURE EDUCATION. Outdoor education methods, materials, and equipment. Discussion of activity programs involving forests, soils, water, and wildlife, with the recreational and educational possibilities of each. Mr. Stevens. Required for women in Physical Education Recreation Education Option. Elective for other women students. Prereq.: Junior standing and permission of the instructor. 2 lec.; 1 lab.; 3 cr.

Forest Game Management

34. FOREST FISH AND GAME. The characteristics of the more important species present in northeastern forests, together with some consideration of the management techniques applicable to each. Mr. Allen. For juniors in Forestry. Elective for others with approval of the instructor. 2 lec.; 1 lab.; 3 cr.

55, 56. FOREST GAME MANAGEMENT. Readings and discussions on the properties of game populations, and the various phases of management, including public relations. The principles of forest management, and the preparation of a working plan for the management of forest and wildlife resources on a specified area. The student may be required to spend several week-ends working with the State Fish and Game Department, helping with investigational projects. Mr. Stevens. For seniors in Wildlife Management. 2 lec.; 1 4-hr. lab.; 4 cr.

Forestry

25. DENDROLOGY. The identification of trees in the field, in autumn and in winter. The principal forest regions of North America, their location, extent, and climatic conditions, as well as the characteristic flora and fauna of each. The forest types of the northeastern United States. Mr. Stevens. Required of freshmen in Forestry. Elective for others. 1 lec.; 1 lab.; 2 cr.

27. SILVICS. The ecological basis of silviculture. Classification of forest communities; environmental factors and their influence on forest vegetation; influence of vegetation on environment. Mr. Hocker. Prereq.: Bot. 1, 6. 2 lec.; 1 lab.; 3 cr.

28. APPLIED STATISTICS. Statistical procedures with emphasis on biometrics. Computational procedures and interpretation of results will be covered

in lecture and laboratory. Mr. Durgin. Prereq.: 3 cr. of Math. 2 lec.; 1 lab.; 3 cr.

29. Silviculture. The theory and techniques of applying ecological knowledge to the control of establishment, composition, and growth of forest stands for economic purposes. Field practice including marketing of stands for various kinds of cutting and cultural treatment. Mr. Hocker. Prereq.: For. 25; For. 27 or Bot. 42. 2 lec.; 1 lab.; 3 cr.

30. Artificial Regeneration. Forest tree improvement, reproduction, collection and testing of forest tree seed, nursery management and outplanting of seedlings, direct seeding of forest stands, planting site surveys. Mr. Hocker. Prereq.: For. 27. 2 lec.; 1 lab.; 3 cr.

43. Forest Mensuration. Theory and practice in the principles of forest mensuration. A consideration of forest inventory, study of growth and yield, and volume table construction. The application of statistical procedures to forest mensuration. Mr. Barrett. Prereq.: For. 28. 2 lec.; 2 lab.; 4 cr.

44. Forest Economics. Application of economics and finance to the forest business. Nature of forest investments, forest taxation, and forest resources. Mr. Wallace. Prereq.: 3 cr. of Econ. 3 lec.; 3 cr.

51, 52. Forest Utilization. Methods of logging and milling in the chief lumber-producing regions of the United States; forest products, their manufacture and markets; special problems of the lumber business. Mr. Swain. Prereq.: Permission of the instructor. 2 lec.; 1 4-hr. lab.; 4 cr.

57. Aerial Photogrammetry in Forestry. Elementary principles of photogrammetry with emphasis on their application to all phases of forestry. The value and use of aerial photos in forest typing, planimetric, and topographic mapping; measurement of area and volume estimation. Prereq.: Permission of instructor. 2 lec.; 2 lab.; 4 cr.

59. Forest Protection. Principles of protection from fire, insects, fungi, climatic extremes, and other injurious agencies. Principles are illustrated by protection of northeastern forests. Emphasis is placed upon the development of resistant forest stands. Mr. Allen. Prereq.: Permission of instructor. 2 lec.; 1 lab.; 3 cr.

61, 62. Problems in (a) Forest Ecology; (b) Photogrammetry; (c) Forest Utilization; (d) Wildlife; (e) Mensuration; (f) Forest Economics; (g) Forest Management. Work to be arranged according to the needs of individual students. Staff. Prereq.: Senior standing and permission of the instructor. Hours to be arranged. 2 to 4 cr.

63. Forest Recreation. The extent, developments, and conflicts in the recreational use of wild lands of North America. Relationships to the conservation of natural resources are considered. Elective for juniors and seniors. Mr. Wallace. Prereq.: Permission of the instructor. 3 cr.

64. Forest Industry Economy. Economy in productive enterprise—logging and manufacturing of forest products; control of harvesting costs as a factor in intensifying applied forest management; planning for minimum cost operations. Mr. Wallace. For seniors in Forestry. Prereq.: Senior or graduate standing in Forestry. 2 lec.; 1 lab.; 3 cr.

66. Wood Identification. The uses of lumber; physical properties and identification of the commercially important woods. Mr. Swain. Prereq.: Permission of the instructor. 2 lec.; 1 lab.; 3 cr.

(69.) Forest Management. The management of forest areas for multiple use on an economic and ecological basis. The integration and application of business methods and the technical phases of forestry. Mr. Bruns. Prereq.: For 29, 43 and 44. 3 lec.; 1 lab.; 4 cr.

Summer Session

41. Game Management Field Practice. Summer camp course. Field work on the University Forest at Passaconaway, N. H., and on a game management area of the White Mountain National Forest. Mr. Stevens. For students in Game Management group. Elective for others by permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

42. Forest Engineering. Field practice at summer camp in forest road location and surveying. Prereq.: For. 28, C.E. 7. Forty hours per week for 3 weeks. 4 cr.

45. Timber Survey. Field practice at summer camp in forest inventory. The measurement of resources on forest lands. Determination of timber, forest game, water and recreational potential and usage. Preparation of maps to show resource location. Staff. Prereq.: For. 29, 43, and 44. Forty hours per week for 5 weeks. 6 cr.

53. Wildlife Ecology Problems. Summer camp course. Special problems in the ecology of forest fish and game. Mr. Stevens. Open to advanced students or to those who show unusual promise in wildlife research. Prereq.: Permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FRENCH

(See Foreign Languages and Literatures)

GEOLOGY AND GEOGRAPHY

Jerome M. Pollack, *Associate Professor;* T. Ralph Meyers, *Professor;* Donald H. Chapman, *Professor;* Glenn W. Stewart, *Associate Professor;* Cecil J. Schneer, *Associate Professor;* William H. Wallace, *Associate Professor*

Geology

1-2. Principles of Geology. The earth and its history. A consideration of land forms and a discussion of the materials and structures of the earth's crust. The interpretation of past geologic events, and their effect on the development of life forms. Mr. Meyers, Mr. Chapman, Mr. Stewart, and Mr. Pollack. 3 lec.; 1 lab.; 4 cr. *No credit toward a major.*

7. General Geology. An introductory course in physical geology. The structures and materials of the earth's crust and the forces which have produced and altered them. Mr. Stewart. For students in Technology and Agriculture. *Open to Liberal Arts students by permission only.* 2 lec.; 2 cr. (Not available for credit after completing Geol. 1.) *No credit toward a major.*

27. Physical-Chemical Mineralogy. An introduction to the theory of natural solids; the structure of the atom; the crystal, its geometry, its physics and chemistry, its natural history; methods of physical-chemical mineralogy. Mr. Schneer. Prereq.: Chem. 4. 2 lec.; 1 lab.; 3 cr.

28. Descriptive and Determinative Mineralogy. The physical and chemical properties of minerals, their associations, modes of occurrence and uses; with training in their identification. Mr. Meyers. Prereq.: Geol. 1 or 7. 2 lec.; 2 lab.; 4 cr.

31. Geomorphology. The factors producing the present aspect of the land surface, particularly that of New England. Special emphasis on the work of running water, glaciers, and marine agents. Field trips during the fall season. Mr. Chapman. Prereq.: Geol. 2 or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

32. Glacial Geology. The characteristics of existing glaciers and an interpretation of Pleistocene glacial features. The abundant and varied evidence of glaciation in northeastern North America and Baltic Europe will be emphasized. New Hampshire examples of both Alpine and Continental glaciation will be studied in the field. Mr. Chapman. Prereq.: Geol. 2. 2 lec.; 1 lab.; 3 cr.

33. Structural Geology. The structural units of the earth's crust and the mechanics of their formation. Mr. Stewart. Prereq.: Geol. 2 and Math. 7-8, Fundamental Mathematics, or permission of the instructor. 3 lec.; 1 lab. or field work; 4 cr.

34. Elements of Petrology. The origin, modes of occurrence, and classification of rocks. Mr. Stewart. Prereq.: Geol. 2 lec.; 1 lab. or field exercise; 3 cr.

36. Sedimentology. The properties of sediments and sedimentary rocks, the sedimentary processes and environments, correlation procedures and stratigraphic principles. Mr. Pollack. Prereq.: Geol. 1 or permission of the instructor. 2 lec.; 1 lab.; 3 cr.

42. Field Geology. Training in basic field methods of geologic mapping. Mr. Stewart. Prereq.: Geol. 33. 1 lec.; 1 lab. or field work; 2 cr.

53-54. Economic Geology. First semester: the types of coal and their occurrence in the United States; petroleum, the structures in which it is found and the distribution and geology of oil fields, especially in the United States; industrial minerals and their utilization. Second semester; the metals, their ores, and the geology of important ore deposits. Mr. Meyers. Prereq.: Geol. 28. 3 cr.

55. Invertebrate Paleontology. The classification, evolution, and stratigraphic occurrence of invertebrate animals as recorded by fossils. Field trips will be made to collect specimens and to study environments of living and fossil material. Mr. Pollack. Prereq.: Geol. 2, or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

57, (57). Geological Problems. Special problems by means of conferences, assigned readings, and field or laboratory work, fitted to individual needs from one of the areas listed below. Mr. Meyers, Mr. Chapman, Mr. Stewart, Mr. Schneer, and Mr. Pollack. Prereq.: Permission of the instructor. 1-2 cr. *This course may be repeated to a total of not more than 5 credits.*

a. Areal Geology
b. Geochemistry
c. Geomorphology, Advanced
d. Geophysics
e. Glacial Geology, Advanced
f. Groundwater Geology
g. Historical Geology, Advanced
h. Industrial Minerals
i. Micropaleontology
j. Mineral Fuels
k. Mineralogy, Advanced
l. Optical Crystallography
m. Ore Deposits
n. Paleontology, Advanced
o. Petrology, Advanced
p. Regional Geology
q. Sedimentation
r. Stratigraphy
s. Structural Geology, Advanced
t. Geology Seminar

Geography

Register for the following courses as Geog. 1, etc.

1, 2. Regional Geography of the World. A survey of the geography of the world, organized in terms of the major cultural areas of the earth. The Polar, European, and Dry World cultural areas are considered during the first semester; the Oriental, African, Pacific, and New World cultural areas are analysed during the second semester. In each area the unique integration of physical and human features that produces the distinctive personality of the region is studied. Mr. Wallace. 3 cr.

3. Physical Geography. The differentiation of the earth in terms of climate, landforms, vegetation, and soil; the regional synthesis of these physical features in selected areas. Mr. Wallace. 3 cr. *This course is not open to students who have taken both Geog. 21 and 22.* (Not offered in 1963-64.)

4. Cultural Geography. The geography of man. Differentiation of the earth in terms of population, settlement, and the basic economic activities, including agriculture, forestry, fishing, mining, manufacturing, and transportation. The inter-relations of cultural phenomena and physical features in selected areas. Mr. Wallace. 3 cr.

(10). Geography of Anglo-America. A regional and topical analysis of the United States and Canada. Physical features and human phenomena are studied in terms of their contributions to the character of the area. Mr. Wallace. *Not open to freshmen.* Prereq.: 3 hours credit in Geography or permission of instructor. 3 cr. (Alternate years; offered 1963-64.)

11. Geography of Europe. A regional and topical analysis of the geography of Europe. The basic theme is the unique complex of physical and human features that produces the great diversity of Europe. Mr. Wallace. *Not open to freshmen.* Prereq.: 3 hours credit in Geography or permission of instructor. 3 cr. (Alternate years; not offered 1963-64.)

21. The Weather. The interpretation of atmospheric phenomena; the heating and circulation of the atmosphere and the nature and movement of the air masses which influence the weather of North America and particularly of New England. Mr. Chapman. 2 cr.

22. Climates of the World. Classification of climates of the world. Examples and brief descriptions of major climate types, and their influence on the life of man. Mr. Chapman. 2 cr.

57, (57). Meteorological or Geographical Problems. Special problems by means of conferences, assigned readings, and laboratory work, fitted to individual needs. Mr. Chapman and Mr. Wallace. Prereq.: Permission of the instructor. 1-5 cr. *This course may be repeated to a total of not more than 5 credits.*

Physical Science

(Register for this course as Ph. Sci. 1-2.)

1-2. The Evolution of Physical Science. The principles and methods of physical science illustrated by the development of major scientific ideas in the physical world. The course is directed toward an understanding of the intellectual achievements and problems of science as part of culture. Mr. Schneer. 3 lec.; 1 lab.; 4 cr. *No credit toward a major.*

GERMAN

(See Foreign Languages and Literatures)

GOVERNMENT

John T. Holden, *Professor;* Robert B. Dishman, *Professor;* Allan A. Kuusisto, *Professor;* David C. Knapp, *Associate Professor;* Robert L. Drake, *Assistant Professor;* George K. Romoser, *Assistant Professor;* Arthur S. Banks, *Instructor;* Robert L. Bradford, *Instructor*

All students majoring in Government must take Government 5 and 6. These two courses qualify the student for his major but may not be counted for major credit.

5, (5). Elements of Political Science. An introduction to politics and government in modern society. The scope and method of political science, the behavior of the individual and group in political society, the nature and structure of political power, and competing political ideologies, e.g., communism, elitism, democracy. Staff. Open to all students. 3 cr.

(6), 6. Principles of American Government. The origins and development of the national government in the United States. The role which legislators, administrators, judges, and the people themselves play in the governmental process and on the constitutional and political framework within which they operate. Staff. Open to all students. 3 cr.

8. America in World Affairs. The problems of American foreign relations. The formulation and execution of policy, the emergence of the United States as a world power, contemporary issues confronting the country, and policies adopted to meet the issues. Mr. Kuusisto, Mr. Holden, and Mr. Bradford. Open to all students. 3 cr.

11. Western European Democrary. A comparative study of the leading democratic systems in Western Europe, including Great Britain, France, and Bonn Germany, with more emphasis on the Common Market and other relevant regional organizations. Mr. Bradford. Prereq.: Gov. 5 or permission of instructor. 3 cr.

12. Totalitarian Dictatorship. A comparative study of totalitarian dictatorship emphasizing the Communist regimes of Russia and China but with some attention given to Fascist regimes. Mr. Bradford. Prereq.: Gov. 5 or permission of instructor. 3 cr.

13. State Government and Politics. A comparative, historical and theoretical examination of the role played by the states and their governmental subdivisions in the American federal system. The relation between structure and politics in state government, and the effect of this relationship on the executive, legislative, and judicial powers. The special areas of intergovernmental relations, regional cooperation, metropolitan growth, state reorganization, fiscal management taxation, and the theories of cooperative federalism and state's rights. Mr. Drake. Prereq.: Gov. 6. 3 cr.

14. Local Government and Politics. An examination of the institutions of local government in the United States, their historical background, and the social, economic, and political environments in which they operate. Particular emphasis is placed on the urban political process and power structures. Examination of municipal planning and some of its devices, i.e., zoning, building codes, and urban renewal are included. Mr. Drake. 3 cr.

15. Political Parties and the Electoral Process. Political parties as an instrument for the popular control of government in the United States. The way in which parties are organized, the methods by which they nominate candidates and campaign for their election, and the groups from which they draw most of their electoral support. Mr. Ford. Prereq.: Gov. 6. 3 cr. (Alternate years; not offered in 1963-64.)

51. Administration of Justice. The nature, sources and problems of the law as distinguished from other forms of social control. The course is analytical and critical, tracing the origin and development of legal institutions from primitive times to the present and evaluating the modern role of judge, jury, and counsel in the administration of justice. The law in action i.e., law as it is applied by courts and practiced by lawyers rather than as it is formulated by the legislative and executive branches. Mr. Dishman. 3 cr.

52. The Supreme Court and the American Constitution. The American Constitution, stressing the basic constitutional principles on which the American political system is founded and their application to present-day social, political, and economic problems. The powers of Congress, the President, and the federal courts and the constitutional limitations by which their respective powers are checked. Mr. Dishman. Prereq.: Gov. 6. 3 cr.

54. Pressure Groups and the Governmental Process. Political interest groups as an unofficial "third house" of American national and state legislatures. The efforts by pressure groups to influence public officials by lobbying, propaganda, and direct political action. Mr. Ford. Prereq.: Gov. 6. 3 cr. (Alternate years; offered 1963-64.)

55. World Politics. The basic driving forces in international relations, including the nature of political power and its extension or limitation. Geopolitics, nationalism, ideology, imperialism, international economic relations, balance of power, warfare, regulation of arms, international law, and collective security. Mr. Holden or Mr. Kuusisto. 3 cr.

56. Foreign Policies of the Great Powers. Fundamental factors influencing contemporary foreign policy formulation of the United States, the

Soviet Union, the British Commonwealth, and other significant powers. Problems and choices confronting policy makers of these powers in dealing with issues involving the United Nations, regional organizations, Western Europe, Middle East, and Asia. Mr. Kuusisto or Mr. Holden. 3 cr.

57. The Administrative Process. The principal concepts of governmental administration, including theories of organization, administrative leadership, internal management, and administrative responsibility and control. The relationship of group behavior and policy development to the administrative process. Mr. Drake. Prereq.: Gov. 6 or Soc. 1. 3 cr.

63. Political Thought in the West. The principal political theories from Plato and Aristotle to the beginning of the modern liberal tradition. The growth and development of political thinking and institutions in terms of the development of modern government. The development of the modern national state and the current challenge to its fundamental institutions. Mr. Holden. 3 cr.

64. Modern Political Thought. Modern western political thought from the emergence of the nation state to the present. The meaning and growth of the basic patterns of thought on the Continent and in England, including liberalism, democracy, nationalism, socialism, communism, and fascism. The contributions of American political thought as it grew from its English origins to the development of the American constitutional system. Mr. Holden. 3 cr.

65, (65). Research in Government Problems. An individual research project in one of the fields of government, e.g., local or state adminstration, comparative government, international relations, international organizations, political theory, politics, or public law to be prepared under the direction of the instructor. Emphasis will be placed on the methods and sources of research in government. Open to senior majors in Government. Mr. Dishman. 3 cr.

67. Public Policy and Regionalism. (Not offered in 1963-64.)

69. Contemporary Southeast Asia. A comparative study of the political and social development of Southeast Asia. The significance of the role of independence and dependence; the competing influence of communism and Western democracy; the special significance of the role of China, India, Great Britain, and the United States. The states to be studied include the Philippines, Laos, Cambodia, Viet Nam, Viet Minh, Thailand, Burma, Malaya and Indonesia. Mr. Holden. 3 cr. (Alternate years; offered 1963-64.)

90. Governments of Emerging Countries. A comparative study of recent developments in the politics and governing systems of Asia and Africa. Some attention will also be given to regional arrangements indigenous to these areas. Mr. Bradford. Prereq.: Gov. 5 or permission of instructor. 3 cr. (Alternate years; offered in 1963-64.)

92. Governments of Latin America. A comparative study of the politics and governing systems of Latin America with some consideration given to regional arrangements. Mr. Kuusisto. Prereq.: Gov. 5 or permission of instructor. 3 cr. (Alternate years; offered in 1964-65.)

97, (97). Seminar in Government. A selected current topic from government, political philosophy and history, political behavior, public law, public administration, or international relations will be the vehicle for this seminar. Special emphasis will be given in 1963-64 to an area approach (South-

east Asia, for example) in the study of international relations. Each student is held responsible for a specific phase of the selected problem. He will also, through the techniques of the seminar, acquaint himself with the whole project. The course is restricted to undergraduates with honor grades and graduate students in Social Science. Advance copies of the syllabus may be secured from the Chairman of the Department. Permission of the instructor is required. Mr. Holden, Mr. Dishman, Mr. Kuusisto, Mr. Drake, Mr. Ford, Mr. Bradford. 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

GREEK

(See Foreign Languages and Literatures)

HISTORY

MARION E. JAMES, *Assistant Professor*; PHILIP M. MARSTON, *Professor*; WILLIAM YALE, *Professor Emeritus*; DAVID F. LONG, *Professor*; GIBSON R. JOHNSON, *Associate Professor*; ALLAN B. PARTRIDGE, *Associate Professor*; HANS HEILBRONNER, *Associate Professor*; ROBERT C. GILMORE, *Associate Professor*; WILLIAM GREENLEAF, *Associate Professor*; CHARLES A. JELLISON, JR., *Assistant Professor*; WILLIAM R. JONES, *Assistant Professor*

In these courses an important place is given to historical reading carried on in the reference room. Often a considerable part of the work is written. The statements in regard to prerequisites are for Liberal Arts students. Agriculture and Technology students should consult the Department Chairman.

Basic Course

The following is a basic course which is required of all students.

1, 2. INTRODUCTION TO CONTEMPORARY CIVILIZATION. A background of appreciation of the significance of man's environment, the nature of man, the cultural heritage from the past, recognition of historical allusions in literature and conversation, and knowledge of the general sequence of historic events. Prehistoric and historic social evolution. The historic explanation of modern life and an appreciation of the problems of contemporary society. Mr. Gilmore, Mr. Greenleaf, Mr. Heilbronner, Miss James, Mr. Jellison, Mr. Johnson, Mr. Jones, Mr. Long, and Mr. Partridge. 3 cr. *No credit toward a major.*

Group A

7, 8. HISTORY OF THE UNITED STATES. American history from Washington's first administration to the present. Political, social, economic, and diplomatic aspects. Mr. Greenleaf and Mr. Long. *Not open to freshmen.* 3 cr.

51, 52. COLONIAL AND REVOLUTIONARY AMERICAN HISTORY. Colonial beginnings in America, national rivalries, the English colonies, the Revolution, and our national life to 1789. Early forms of Americanism in the making. Mr. Marston. 3 cr.

83, 84. The Foreign Relations of the United States. Primarily the history of American diplomacy, with attention given to the non-diplomatic aspects of foreign relations. Mr. Long. 3 cr.

85, 86. Twentieth-Century America. United States history since 1896, from the triumph of industrialism on the national scene to the emergence of America as a world power in the nuclear age. Political, economic, and diplomatic developments. Mr. Greenleaf. 3 cr.

87, 88. Nineteenth-Century America. The historical factors, both domestic and international, involved in the development of the American Republic, its institutions and people, from the inception of the new nation in 1789 to the emergence of the United States as a world power in 1900. Mr. Jellison. 3 cr. (Hist. 88 not offered in 1963-64.)

Group B

19, 20. Modern European History. Europe from the end of the Middle Ages to our own times. The evolution of the national state; international relations; the expansion of Europe overseas; and the background of our modern Western civilization especially its ideas, literature and art. A basic course for those who wish to proceed further in the study of European history as well as a survey for those who are interested in special aspects of Western cultural development. *Not open to freshmen.* 3 cr.

21, 22. History of England. The history of the British Isles from earliest times to the present, and a consideration of the British Empire and Commonwealth of Nations. A parallel to English literature, a background to American political history, and a study of English culture and institutions in the democratic and social integration of the world. Mr. Partridge. *Not open to freshmen.* 3 cr.

65, 66. Medieval History. History of Europe and the Mediterranean area from the late Roman Empire to the Renaissance. Mr. Jones. 3 cr.

67. Renaissance and Reformation. The history of Europe during the fifteenth and sixteenth centuries with primary emphasis on the Italian Renaissance, the Protestant Reformation and the emergence of the National State. 3 cr. (Not offered in 1963-64.)

70. Twentieth-Century Europe. European history in the twentieth century will be treated from the point of view of a civilization in a constant state of crisis. World War I, the interwar period, World War II, and the attempts to solve the conflicts of modern society after that war in terms of new economic, political, and cultural patterns will represent the core of the study. The effects of extra-European influences, the loss of European primacy and continued strife within the structure of the European state and cultural system will receive great emphasis. Mr. Heilbronner. 3 cr.

71, 72. History of Russia. The development of the Russian state from its foundation to its present status as a world power. The course is designed to increase the understanding of the present in terms of the past. Political developments, foreign relations, and intellectual and ideological currents. Mr. Heilbronner. 3 cr.

Group C

9, 10. Latin-American History. The development and influence of Spanish and Portuguese culture as a widespread world force; the history of

the Latin-American peoples; the relationship of Latin America to North America, particularly in view of recent growth in friendly and diplomatic relations. Mr. Partridge. *Not open to freshmen.* 3 cr.

11, 12. The Mediterranean World in Ancient and Classical Times. The contributions made by the peoples of the Ancient Near East, the Hellenic and Hellenistic civilizations, and the Romans to Western civilization. Miss James. *Not open to freshmen.* 3 cr. (Not open to students who have credit for the former History 11, 12, 13.)

31, 32. Asia in Transition. The old and the new China, Japan, and India. A general introduction to the changes taking place in Asia. The impact of Europe, Russia, and America in the East. The response of the East in the form of political and cultural evolution and revolution. The rise and development of Chinese Communism. A basic course for those interested in cultural, political, industrial, or business developments in the East, and a general course for an understanding of the East. *Not open to freshmen.* 3 cr. *(Formerly Hist. 75, 76.)*

Honors Program 97, (97). An honors program involving two types of work: (1) The student carries on independent study in some specialized areas (according to the requirements of the existing independent study program). (2) The student attends a seminar in which he discusses the nature of history, historical method, and a survey of historical writing, various historical philosophies, and interpretations. Prereq.: A student must have a cumulative average of 3.0, or must show an exceptional aptitude for history. Each case will be judged individually. 3 or 6 cr.

History-Education 91. Problems in the Teaching of High School History and Other Social Studies. Bibliography and new interpretations of history; the social studies curriculum, past and present; aims and objectives in the social studies; selection and organization of teaching material; teaching and testing techniques. Special emphasis on teaching American history and the problems of American democracy. Open to students who have satisfactorily completed History 7, 8; six credits in other history courses, exclusive of History 1, 2; six credits from American Government, Principles of Economics or Principles of Sociology; and Principles and Problems of Teaching in the Secondary School. 3 cr. This course may not be used to satisfy major requirements.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

HOME ECONOMICS

Marjory A. Wybourn, *Professor;* Elizabeth Rand, *Associate Professor;* Frances Platts, *Associate Professor;* Ruth Pearce, *Assistant Professor;* Dorothy Wills, *Assistant Professor*

Child Development and Family Life

25-26, (25). Child Development. The development and guidance of the child from the prenatal to the adolescent period, with emphasis on the preschool child. Observation and work at the University Nursery School. Study of children in other situations may be included during the second semester. Not open to freshmen. 3 cr.

81, 82. Projects in Child Development. Discussion, conferences, and supplementary projects based upon special interests of the student. Work with children in the University Nursery School or in other situations. Prereq.: H.E. 26 and permission of the instructor. 1-3 cr.

83, (83). Family Development. Consideration of relationships and individual growth and development within the home and community at all stages of the family life cycle. Understanding of different cultures and ways of life. 3 cr.

84. Personal Family and Community Health. A study of public and private health resources and agencies. Consumer problems related to family health are investigated. Field trips included. 2 cr. 8 weeks.

Clothing and Textiles

4. Textiles. The textile fibers and their characteristics, natural and man-made as related to their selection, care, and ultimate use. Includes laboratory. 3 cr.

5, (5). Clothing Construction. Planning, purchasing, and using patterns and fabrics for clothing. Basic principles of garment construction. Includes laboratory. 3 cr.

31, (31). Interior Design. An application of the principles of design to the decorating of the home. Economic and social factors relating to housing for the family. Prereq.: Arts 23. 3 cr.

40. Flat Pattern. Application of the principles of flat pattern designing to the development of design ideas for apparel. Garment construction. Prereq.: H.E. 5. Includes laboratory. 3 cr.

43. Draping. Basic principles of fabric manipulation in the draping processes and the development of patterns and garments through this method. Prereq.: H.E. 5. Includes laboratory. 3 cr.

61. Tailoring. The appreciation and application of tailoring principles to making and buying tailored garments. Prereq.: H.E. 40 or 43. Includes laboratory. 3 cr.

65. History of Costume. A broad historical survey of western world costume from primitive times to the present. The influence of social, religious, and political conditions of the eras studied to costume evolution. 3 cr.

(67). Fundamentals of Fashion. Economic, psychological, and sociological problems inherent in the field of fashion. The development of the fashion industry. 2 cr.

69. Advanced Textiles. Investigation and evaluation of fabrics in everyday use. Consumer problems with emphasis on economic and social implications. Prereq.: H.E. 4. 3 cr.

Foods and Nutrition

(18), 18. Principles of Food Selection and Preparation. The scientific principles involved in selection, preparation, and preservation of food. Includes laboratory. 3 cr.

19, (19). Menu Planning and Service. Meal management; the planning, marketing, preparation and service of meals for the family. Prereq.: H.E. 18. Includes laboratory. 3 cr.

71. Experimental Foods. Application of the experimental method of study to problems in foods. Methods of evaluating food quality. Prereq.: H.E. 18 and permission of instructor. Includes laboratory. 3 cr.

73. Nutrition. A study of the nutrients essential to human life and well-being, their functions in metabolism, sources in food, and relationship between food habits and health. Prereq.: H.E. 18. 3 cr.

74. Nutrition in Health and Disease. Dietary modification and management and the metabolic bases for nutritional therapy in the treatment of disease. Prereq.: H.E. 73. 3 cr.

76. Nutrition Seminar. Critical review of literature in the field of nutrition with emphasis on experimental data on which principles of human nutrition are based. Prereq.: Permission of instructor. 3 cr.

86. Food Trends and Developments. Investigation and evaluation of developments in food production, preparation, and preservation. Instructional field trips constitute a major portion of class time. 4 cr.

Home Economics Education

91. Methods in Home Economics Education. Home economics education in the school program, curriculum materials, methods, and resources in teaching home economics. 3 cr.

94. Supervised Teaching in Home Economics. Eight weeks of supervised teaching in a school. Prereq.: Educ. 57-58 and H.E. 91. 7 cr.

96. Seminar in Home Economics Education. Recent developments and problems in teaching home economics at all levels. Individuals or small groups may work on specific problems in the field. Prereq.: H.E. 91 or equivalent. 3 cr.

Home Management

87. Home Management. The management of individual and family resources as related to human needs, values, and goals throughout the life cycle of the family. 3 cr.

88. Home Management Residence. Management principles in the operation of the home. Permission of instructor. 3 cr.

Institutional Administration

21, 22. Quantity Foods and Purchasing. Principles and methods of quantity food production and purchasing. Laboratory experiences in the University Dining Halls. Prereq.: H.E. 18. 3 cr.

53. Organization and Management of Institutional Food Service. Study of supervision, personnel policies, menu planning, food production and merchandising, cost control, budgeting, plant planning, maintenance, and sanitation as related to institutional food service. Prereq.: H.E. 18. 3 cr.

(48), 48. Field Work. A supervised experience which provides an opportunity for home economics students to explore various professional fields. Prereq.: Permission of adviser. 3-6 cr.

HORTICULTURE

Russell Eggert, *Associate Professor;* L. Phelps Latimer, *Associate Professor Emeritus;* Owen M. Rogers, *Assistant Professor*

General Horticulture

2. Plant Propagation. Discussion and practice including soil, sand, and peat media; seed treatments, seeding, watering, light, feeding, and temperatures; leafy, softwood, and hardwood cuttings; hormone treatment; budding, root, top and bridge-grafting; seedbed nursery practice. Mr. Rogers. 2 cr.

4. General Horticulture. The principles and practices of horticulture, including fruits, vegetables, and ornamentals, as they apply to both commercial production and the growing of plants in and around the home. Staff. 2 lec.; 1 lab.; 3 cr. (Not offered 1963-64.)

13. Horticultural Products and Judging. Selection of fruits, vegetables, and flowers for exhibition, marketing, and domestic use. The management and judging of small fairs and exhibitions. A wide range of plants and varieties, both fresh and frozen, are used as class material. Required of all Horticulture majors and recommended for others who are training for such positions as county agricultural agents, home demonstration agents, club leaders, or Smith-Hughes teachers. 2 lab.; 2 cr.

66. Nursery Management. The development of the nursery business. Factors that influence the location of a nursery, layout of the plant, soil and site, types of plants, pest control, inspection, digging, grading, storage, packing, shipping, and sales. Mr. Eggert. Prereq.: Plant Propagation. 1 lec.; 1 lab.; 2 cr. (Alternate years; not offered in 1963-64.)

91, 92. Horticulture Seminar. A review of current horticultural literature and techniques in horticultural research. Students are required to prepare and present papers on selected topics. Mr. Rogers. This course may be repeated for credit. 1 cr.

94. Principles of Plant Breeding. Application of the principles of genetics to practical plant breeding. Hybridization, chemical treatments, and selection as means of producing and improving varieties. Mr. Rogers. Prereq.: Zool. 61. 2 lec.; 1 lab.; 3 cr.

95, 96. Investigations In:

a. Fruits — Mr. Eggert
b. Flowers — Mr. Rogers
c. Vegetables —
d. Ornamentals — Mr. Rogers
e. Plant Breeding — Mr. Rogers

Elective only after consultation with the instructor in charge. Hours to be arranged. 1 to 4 cr. Course may be repeated for credit.

Fruit Crops

53. Orchard Fruits. Examination of fundamental principles and experimental data and their application to orchard problems, including the establishment of orchards, soil management, water and fertilizer requirements, mineral deficiencies, training and pruning, fruit bud formation, pollination and fruit setting, thinning and winter injury. Mr. Eggert. 3 cr.

54. Small Fruits. The culture and economic uses of the strawberry, raspberry, blackberry, blueberry, cranberry, and grape. Each fruit is considered with relation to its history, propagation, planting, pruning, harvesting, marketing, insects and diseases, and domestic uses. Mr. Eggert. 3 cr. (Alternate years; offered in 1963-64.)

Vegetable Crops

63. The Development of the Vegetable Industry. Similarities and differences in management of vegetable production for fresh market, processing, seed, roadside sales, and home use. The significance of the plant processes of photosynthesis, respiration, and translocation to the vegetable grower. Environmental factors of soil, temperature, and moisture as they affect vegetable production. The management and role of plant growing structures, seed testing, variety selection, nutrition, weed control, and irrigation in the home garden and commercial plantings. 2 lec.; 1 lab.; 3 cr.

64. The Commercial Production, Storage, and Marketing of Several Different Vegetable Crops. The management methods of culture, weed control, insect and disease control, nutrition, irrigation, and marketing of different types of vegetables and in different soils. The use of limitations of specialized equipment and chemicals together with a review of recent experimental work in vegetable production. 2 lec.; 1 lab.; 3 cr.

Ornamentals and Floriculture

27. Landscaping the Home Grounds. The design and maintenance of small properties with emphasis on the principles of arrangement and the use and identification of plant materials in the beautification of home surroundings. Mr. Rogers. 2 lec.; 1 lab.; 3 cr.

37. Floral Arrangement. Floral design and the use of flowers in the home; practice in floral arrangement. A laboratory fee of $5.00 is charged. Mr. Rogers. Prereq.: Permission of the instructor. 1 lab.; 1 cr.

59. Greenhouse Management. Modern methods of greenhouse management including soils, watering, costs of production and marketing, and fundamentals of plant behavior under glass. Mr. Rogers. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1963-64.)

78. Commercial Greenhouse Crops. A survey of the principal greenhouse crops and an intensive study of their individual culture. Mr. Rogers. Prereq.: Greenhouse Management. 2 rec.; 1 lab.; 3 cr. (Alternate years; offered in 1963-64.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

HOTEL ADMINISTRATION

DONALD E. LUNDBERG, *Professor*; KENNARD LANG, *Lecturer*

The courses listed below are primarily for students in Hotel Administration. Other students are invited to elect these courses provided they have the prerequisites.

1. INTRODUCTION TO HOTEL MANAGEMENT. The scope of the hotel business, both resort and commercial. A history of hospitality. The development of resort and commercial operations in the U. S. 1 cr. *Required of freshmen in Hotel Administration.*

30. RESORT MANAGEMENT PRACTICUM. Field work of at least 70 days in a resort hotel. A weekly seminar, weekly reports, and job studies are parts of the course. Hotel Administration majors only. 2 cr.

31. PRACTICUM IN COMMERCIAL HOTEL OPERATION. Field work lasting at least 70 days. This work covers the front of the house including engineering department. Hotel Administration majors only. 2 cr.

32. PRACTICUM IN COMMERCIAL HOTEL OPERATION. Field work lasting at least 70 days. This work covers the back of the house and includes the housekeeping department. Hotel Administration majors only. 2 cr.

33. PRACTICUM IN CLUB MANAGEMENT. Experience on the job of at least 70 days in an approved city or country club. Written reports are required and rotation of work around the front and the back of the club is necessary. Hotel Administration majors only. 2 cr.

34. PRACTICUM IN INSTITUTIONAL FOOD SERVICE. Field work of at least 70 days duration in an approved school or hospital food service. Job studies and written reports are required. Hotel Administration majors only. 2 cr.

40, 42, 44, 46. LECTURES ON HOTEL MANAGEMENT. Delivered by representative and well-known men in the hotel business and allied fields. ½ cr. for each course.

55. HOTEL OPERATION. The problems of hotel management. The organization, personnel, and work of the departments, front office procedure, rate structure, and the methods of securing and financing a hotel business. B.A. 9 should precede or accompany this course. 3 cr.

56. HOTEL ENGINEERING PROBLEMS. Basic principles of electricity and heat, laundry practices and equipment, kitchen planning and layouts, pumps and vacuum systems, water supply and use, fire protection, and other mechanical problems of operating hotel or motel buildings. 3 lec.; 1 lab.; 3 cr.

66. HOTEL PROMOTION AND SALES. The principles and practices used in building hotel and restaurant sales. Taught by the project method. 2 cr.

67. STEWARDING AND CATERING. Purchasing, receiving, and storing of foods. Planning and preparation of catered functions. 1 lec.; 1 lab.; 3 cr.

68. PERSONNEL AND LABOR RELATIONS IN HOTELS AND RESTAURANTS. The application of the principles of personnel management and labor relations to the hotel and restaurant business. 3 cr.

69. HOTEL HONORS SEMINAR. A research and problems course concerned with advancing knowledge in the hotel and restaurant field. 3 cr.

HUMANITIES

Register for this course as Hu. 1-2.

1-2. Humanities. A course in general education involving the departments of English, Foreign Languages and Literatures, Philosophy, The Arts, and Music. It aims to develop an appreciation of literature, the various arts, and philosophy, and to give an understanding of western cultural traditions. The course will operate within an historical framework but is not intended to be an historical survey. Weekly lectures or demonstrations, readings, slides, films, recordings, class recitations, and discussion. There will be at least one museum trip each semester. Mr. Casas, Mr. Daggett, Mr. Fasanelli, Mr. Maynard, Mr. Asher Moore, and guest lecturers. *Not open to freshmen.* 3 cr.

ITALIAN

(See Foreign Languages and Literatures)

LANGUAGES

(See Foreign Languages and Literatures)

LATIN

(See Foreign Languages and Literatures)

LIBERAL ARTS

The following courses are non-departmental courses open only to students in the College of Liberal Arts. Register for them as L.A. 51, etc.

51, (51). Senior Synthesis: American Civilization in Transition. To assist the student in integrating the knowledge and skills which he has acquired. The student is put into contact with a variety of ideas and methods which seem important to an understanding of our changing society. Lectures by experts in a variety of academic fields. The ideas, methods, and techniques of integration of these experts constitute the basic data for the course. Each Division of the College of Liberal Arts supplies guest speakers for the course. Mr. Menge, Mr. Nicoloff, and Mr. Bobick. *Prior to registration in L.A. 51, an interview with a member of the course staff is required.* Prereq.: Senior standing in the College of Liberal Arts. One two-hour lecture and discussion period with a guest speaker and two one-hour seminar periods. 3 cr.

97, (97). Independent Study. See description of the plan on page 90. Not less than 6 cr. nor more than 12 cr. for a year.

MATHEMATICS

M. Evans Munroe, *Professor;* Marvin R. Solt, *Professor;* William L. Kichline, *Professor;* Robert J. Silverman, *Professor;* Shepley L. Ross, *Associate Professor;* Robert H. Owens, *Associate Professor;* Edward H. Batho, *Associate Professor;* John C. Mairhuber, *Associate Professor;* A. Robb Jacoby, *Associate Professor;* Donald M. Perkins, *Assistant Professor;* Robert O. Kimball, *Assistant Professor;* Frederick J. Robinson, *Assistant Professor;* David M. Burton, *Assistant Professor;* William E. Bonnice, *Assistant Professor*

5. Introductory College Mathematics. Enrichment and development of the material presented in the last part of the senior high school mathematics program. Content: Trigonometry, analytic geometry, theory of equations, inequalities, number systems, permutations and combinations; elementary set theory. Prereq.: at least 3 entrance units in mathematics taken exclusively from the fields of algebra, geometry, and trigonometry, and including work in all three of these subjects. 3 cr. Does not count for major credit in Mathematics.

7-8. Fundamental Mathematics. Introduction to logic, selected topics in mathematical structures; limits, continuity, introduction to calculus; finite mathematics; probability and statistical inference; theory of games. Recommended for non-technical students desiring a year's work in mathematics at the University level. Prereq.: At least 3 entrance units in mathematics taken exclusively from the fields of algebra, geometry, and trigonometry, and including work in all three of these subjects. 3 cr. Does not count for major credit in Mathematics.

21. Calculus B 1. The derivative and the integral for polynomial functions with applications; review of fractions, exponents, radicals, trigonometric identities, exponential and logarithmic functions; derivative and integral formulas for algebraic and transcendental functions. Students electing calculus will be placed in the 21-22-23 sequence or in the 25-26 sequence on the basis of an achievement test in algebra and trigonometry. Prereq.: 2 years of algebra, 1 year of geometry, ½ year of trigonometry. 5 cr. Does not count for major credit in Mathematics.

22. Calculus B 2. Limits and indeterminate forms; lines and conics; use of derivatives in curve sketching; polar coordinates; the modern theory of the differential; applications of integration. Prereq.: Math. 21. 5 cr. Does not count for major credit in Mathematics.

23. Calculus B 3. Integration by parts, by partial fractions, and by substitution; iterated integrals and applications; series. Prereq.: Math. 22. 5 cr.

24. Differential Equations. Basic concepts, methods, and applications of ordinary differential equations; exact and approximate methods for solving first order equations; higher order linear equations; series solutions; systems of equations; boundary value problems. Prereq.: Math. 23 or 26. 3 cr.

25. Calculus A 1. The derivative and the integral for polynomial functions with applications; derivative and integral formulas for algebraic and transcendental functions; limits and indeterminate forms; lines and conics; use of derivatives in curve sketching; polar coordinates. Students electing calculus will be placed in the 21-22-23 sequence or in the 25-26 sequence on the basis of an achievement test in algebra and trigonometry. Prereq.:

2 years of algebra, 1 year of geometry, ½ year of trigonometry. 5 cr. Does not count for major credit in Mathematics.

26. Calculus A 2. The modern theory of the differential; applications of integration; integration by parts, by partial fractions and by substitution; iterated integrals and applications; series. Prereq.: Math. 25. 5 cr.

27. Multi-dimensional Calculus. Vectors, matrices and linear transformations, partial derivatives, maximum-minimum problems, implicit function theorem and applications, vector differential calculus, exterior products and multiple integrals, the generalized Stokes theorem and its classical specializations. Prereq.: Math. 23 or 26. 5 cr.

30. Astronomy. A brief descriptive course. A study of the physical characteristics and motions of the members of the solar system and the sidereal universe. Illustrated lectures, recitations, and practice in the use of equatorial telescope. Mr. Solt. Prereq.: One year of college physical science. 3 cr.

31. Introduction to Set Theory and Number Systems. Fundamental concepts of logic and set theory; formal development of the rational, real; and complex number systems. Prereq.: Math. 22 or 26. 4 cr.

41. Probability. Discrete and continuous distributions; random variables; moments; normal and Poisson distributions; the central limit theorem; laws of large numbers. Prereq.: Math. 31. 3 cr.

51. Methods of Applied Mathematics I. Solutions of ordinary differential equations by D-operators, Laplace Transforms, and by series; representation of functions by definite integrals (Gamma, Beta, and error functions); Bessel functions; Fourier Series. Prereq.: Math. 24. 4 cr.

52. Methods of Applied Mathematics II. Vector analysis (line, surface, and volume integrals); elementary variational techniques; development of some partial differential equations of mathematical physics; solutions of partial differential equations by Laplace transforms and by Green's functions. Prereq.: Math. 51. 4 cr.

53-54. Methods and Techniques of Modern Computation. Methods of numerical analysis which are believed to be particularly suitable for high speed computation, including some newly developed methods. Methods for making analytical approximations will also be emphasized. An introduction to programming techniques, assembly and compiler programs, interpretive systems and symbolic operations. In the laboratory portion of the course, the practical aspects of modern computation, such as loss of precision, round-off error, overflow and underflow, etc., will be illustrated by means of short problems on both the desk calculator and the digital computer in the UNH Computation Center. A long range project for investigation on the computer will be assigned. Prereq.: Math. 24. 3 lec.; 1 lab.; 4 cr.

55. Fundamental Concepts of Geometry. Systems of postulates of various geometries; geometric invariants; synthetic and analytic projective geometry; introduction to non-Euclidean geometry, topology, and the elementary differential geometry of curves and surfaces. Prereq.: Math. 23 or 26. 4 cr.

56. Topics in Number Theory. Elementary properties of integers; the Euclidean algorithm; divisibility; diophantine equations of the first degree; congruences; residue classes and the Euler function; distribution of primes;

quadratic residues; diophantine equations of the second degree; selected topics in diophantine approximation and number-theoretic functions. Prereq.: Math. 26 or 23. 4 cr.

61. Higher Algebra I. The integers; the rational and complex number systems; congruences; polynomials; groups; rings; integral domains; fields. Prereq.: Math. 23 or 26. 4 cr.

62. Higher Algebra II. Vector spaces and transformations; matrices and determinants. Prereq.: Math. 61. 4 cr.

67. Real Analysis I. The real number system; elements of set theory; theory of limits; continuous functions and their properties; differentiability and the mean value theorem. Prereq.: Math. 23 or 26. 4 cr.

68. Real Analysis II. The Riemann integral; uniform convergence; double and iterated limits; applications of double limit theorem to series, limits under the integral sign and existence theorems for differential equations. Prereq.: Math. 67. 4 cr.

71-72. Foundations of the Number System. Postulates and mathematical structures. A study of various mathematical systems designed to show the nature and significance of the fundamental principles of arithmetic. Intended primarily for elementary school teachers. Prereq.: Consent of instructor. 3 cr.

73. Mathematical Statistics I. Sampling theory; estimation of parameters; the multivariate normal distribution. Prereq.: Math. 41. 4 cr.

74. Mathematical Statistics II. Testing statistical hypotheses, confidence intervals, regression and correlation, non-parametric methods, and other topics. Prereq.: Math. 73. 4 cr.

75. Group Theory and Principal Ideal Domains. Finite groups and their applications; Galois theory; Sylow theorems; structure of principal ideal domains with applications to elementary divisor theory; unique factorization domains. Prereq.: Math. 62. 4 cr.

81. Theory of Approximation. The theorems of Weierstrass on approximation of continuous functions; the Tschebycheff approximation problem; Tschebycheff polynomials; trigonometric polynomials of best approximation; interpolation; the formulas of Lagrange and Newton; trigonometric interpolation. Prereq.: Math. 24. 4 cr.

82. Non-Linear Differential Equations. Phase plane analysis of lineal systems and non-linear conservative systems; stability theorems; limit cycles and periodic solutions; the Van der Pol equation; the method of Kryloff and Bogoliouboff. Prereq.: Math. 24. 4 cr.

83. Introduction to Differential Geometry. A first course in the metric differential Geometry of curves and surfaces in Euclidean space. Prereq.: Math. 24. 4 cr.

84. Introduction to Topology. Elementary point-set topology in metric and topological spaces, in particular the real line and plane. Prereq.: Math. 61. 4 cr.

88. Complex Analysis. The complex number system; analyticity; elementary functions; Cauchy integral theorem and formulas; Taylor and

Laurent series; singularities and residues; conformal mapping. Prereq.: Math. 24. 4 cr.

91. Mathematics-Education (Math-Ed). The aims and values of secondary-school mathematics; the recommendations of the national committee on mathematics requirements, and the State Board requirements; the subject matter and the sequence in which it should be presented in both junior and senior high schools; techniques and instructional aids used in teaching secondary-school mathematics; errors, testing program, remedial teaching. Students preparing to teach mathematics in high school should register for this course — it is a prerequisite for Supervised Teaching in Mathematics. Lectures, assigned readings and discussion. Prereq.: Education 58 and Math. 23 or 26. 3 cr. May be counted as major credit only by students preparing to teach mathematics in the secondary schools.

96. Introduction to Theory of Differential Equations. Existence and uniqueness theorems for ordinary differential equations; theory of linear ordinary differential equations of order n; oscillation and comparison theorems for second order linear ordinary differential equations; first order partial differential equations; linear partial differential equations of the second order. Prereq.: Math. 67. 4 cr.

98. Senior Seminar. Individual study on special topics. Preparation and presentation of reports on topics assigned. Prereq.: Senior standing in mathematics. 3 cr.

99. Independent Study. Individual study projects in various areas of mathematics as determined to be of interest and value to the student and the Department. Supervision is by an appropriate faculty member. Consent of the faculty supervisor and Department chairman is required. 1 to 6 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

MECHANICAL ENGINEERING

Edward T. Donovan, *Professor;* E. Howard Stolworthy, *Professor;* Tenho S. Kauppinen, *Associate Professor;* Russell L. Valentine, *Associate Professor;* E. Eugene Allmendinger, *Associate Professor;* Douglas M. Norris, Jr., *Associate Professor;* William E. Clark, *Assistant Professor;* William Mosberg, *Assistant Professor;* Frederick G. Hochgraf, *Assistant Professor;* Harvard B. Emery, *Instructor;* John A. Wilson, *Instructor;* Lyman J. Batchelder, *Instructor Emeritus;* Elias M. O'Connell, *Instructor Emeritus;* John C. Tonkin, *Instructor Emeritus*

13-14. Engineering Drawing. Representation of engineering information by multiview drawings, pictorial views, sketches, and graphs. The fundamentals of descriptive geometry. Mr. Kauppinen and Mr. Emery. 1 lab.; 1 cr.

17. Manufacturing Processes and Design. A study of the machines and processes that are used in manufacturing and an analysis of the effect of these processes on the design of manufactured parts. Mr. Clark. Prereq.: M.E. 14. 3 lab.; 3 cr.

22, (22). Materials I. An introduction to the structure and properties of metals, plastics, and ceramics with a special emphasis on the influence of atomic structure on physical properties. Solidification, equilibrium multi-

phase relations, deformation models, elastic energy as a driving force. Mr. Hochgraf. 3 cr.

25. Statics. Analytical and graphical methods of determining forces in rigid bodies in equilibrium; properties of areas and bodies. Mr. Kauppinen, Mr. Allmendinger, Mr. Clark, Mr. Norris, and Mr. Wilson. Prereq.: Math. 22 or 26. Phys. 18. 2 cr.

26. Dynamics. Kinematics, kinetics, and introduction to vibrations of mechanical systems. Mr. Kauppinen, Mr. Allmendinger, Mr. Clark, Mr. Norris, and Mr. Wilson. Prereq.: M.E. 25. Prereq. or concurrent: Math. 24. 3 cr.

32, (32). Machine Shop Practice. Advanced work in machine tools and their use, production methods, inspection, and control. Mr. Clark. Prereq.: M.E. 17. 2 lab.; 2 cr.

33, (33). Thermodynamics. The fundamental laws of thermodynamics and their relation to working substances. Prereq. or concurrent: Phys. 24. 3 cr.

34, (34). Thermodynamics. A more comprehensive study of thermodynamic properties of media; thermodynamics of combustion; heat transfer. Prereq.: M.E. 33. 3 cr.

35, (35). Strength of Materials. Stress and strains in structural and machine elements. Prereq.: M.E. 25. 3 cr.

36. Fluid Dynamics. Fundamentals and phenomena of compressible and incompressible fluid flow and its relation to thermodynamics, including fluid properties, energy transfer and momentum principles. Specifically considered are adiabatic flow with and without friction, diabatic flow, dimensional analysis and flow measurement. Prereq.: M.E. 26, 33. 3 cr.

37. Mechanical Laboratory. Study and instrumentation of mechanical engineering equipment. Prereq. or concurrent: M.E. 33. 1 lab.; 1 cr.

38. Mechanical Laboratory. Investigation of the operating characteristics of mechanical equipment and heat exchangers; preparation of engineering reports. Prereq.: M.E. 37. Prereq. or concurrent: M.E. 34, 36. 2 lab.; 2 cr.

40. Heating and Air Conditioning. Present methods of heating and air conditioning buildings. Mr. Stolworthy and Mr. Donovan. Prereq.: Hotel Ad. 56. 2 rec.; 1 lab.; 3 cr.

41-42. Mechanical Engineering Seminar. Student reports and discussions of recent developments in mechanical engineering. Prereq.: Senior standing. 1 cr.

43-44. Machine Design and Analysis. Analysis and design of mechanical elements and systems, utilizing and developing further the fundamentals of strength of materials and dynamics. Prereq.: M.E. 26, 35, Math. 24. 3 cr.

49. Thesis. An investigation or research of some mechanical engineering problem. Elective for seniors in Mechanical Engineering. Prereq.: Permission of the Department. 2 cr.

51, 52. Mechanical Engineering Project. A special study involving investigation of problems or areas germane to Mechanical Engineering. Prereq.: Permission of department. 1-3 cr.

53. Power Plants. A study of the steam generating plant dealing with its equipment and costs. Mr. Donovan and Mr. Stolworthy. Prereq.: M.E. 34. 3 cr.

54. Power Plants. Heat transmission theory. Heat transmission problems on power plant equipment and mechanical equipment. Mr. Donovan and Mr. Stolworthy. Prereq.: M.E. 34. 3 cr.

55. Internal Combustion Engines. Thermodynamics applied to spark ignition and compression ignition engines. Fuels, carburetion, fuel injection, lubrication, performance. Mr. Stolworthy. Prereq.: M.E. 33. 2 lec.; 1 lab.; 3 cr.

56. Internal Combustion Engines. Thermodynamics applied to gas turbines and propulsion motors. Fuels, combustion, and performance. Mr. Stolworthy. Prereq.: M.E. 34 and 36. 2 lec.; 1 lab.; 3 cr.

57-58. Heat and Power Systems. Analysis and solution of heat and power system problems, utilizing and developing further the fundamentals of thermodynamics, fluid flow, combustion, and heat transfer. Prereq.: M.E. 34, 36, and 38. 3 lec.; 1 lab.; 4 cr.

63. Materials II. Behavior of metals, plastics, and ceramics in engineering environments. Non-equilibrium multiphase relations, diffusion, nucleation of phases, dislocation models of creep and relaxation, ductile and brittle modes of failure, thermal stresses, modification of bulk and surface properties through deformation and heat treating. Laboratory work includes observation of properties by classical mechanical methods. Mr. Hochgraf. Prereq.: M.E. 22. 2 lec.; 1 lab.; 3 cr.

65. Engineering Economy. The principles which form the basis of engineering procedures for obtaining the highest ratio of utility to cost. Mr. Donovan. Prereq.: Senior standing. 3 cr.

66. Industrial Management. Principles and methods of industrial management, designed to give students a working knowledge of modern industrial practice, with particular emphasis on the engineering viewpoint. Prereq.: Senior standing. Mr. Donovan. 3 cr.

67. X-Ray Metallography. Theoretical and experimental studies of X-ray diffraction and micro-radiography. Production of x-rays; directions and intensities of diffracted beams; Laue and Debye-Scherrer photographs; size, perfection, and orientation of grains; phase diagram determinations; stress measurement. Mr. Hochgraf. Prereq.: M.E. 22 or permission of instructor. 2 rec.; 1 lab.; 3 cr.

71. Naval Architecture I. Introduction to ships — nomenclature and types. Geometry and hull form delineation. Hydrostatic characteristics of freely floating, partially waterborne, and damaged ships. Hydrostatic characteristics of submerged bodies. Introduction to ship strength. Computer application to problems. Mr. Allmendinger. Prereq.: M.E. 25, M.E. 35 (may be taken concurrently). 3 cr.

72. Naval Architecture II. Hydrodynamic resistances — surface ships and submerged bodies. Model testing theory. Powering and propellers. Use of "Standard Series" tests. Introduction to ship motion and control steering and rudders. Concepts of ship design. Computer application to problems. Mr. Allmendinger. Prereq.: M.E. 26, M.E. 71, Math. 24. 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

MICROBIOLOGY

Lawrence W. Slanetz, *Professor;* Theodore G. Metcalf, *Professor;* William Chesbro, *Assistant Professor*

1. General Microbiology. Principles of microbiology; morphology, physiology, and classification of bacteria and other microorganisms, and their relationship to agriculture, industry, sanitation, and infectious diseases. Mr. Slanetz, Mr. Metcalf, and Mr. Chesbro. Prereq.: Chem. 1-2 or equivalent. 2 lec.; 2 lab.; 4 cr.

2. Food and Sanitary Microbiology. Relation of microorganisms to food production; food preservation; food infections and intoxications; standard laboratory methods for the bacteriological examination of foods. Microbiology and sanitation of milk, water, sewage, air, and eating utensils. Disinfection and disinfectants. Mr. Slanetz and Mr. Chesbro. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr.

5. Public Health and Sanitation. The nature and types of microbes causing infectious diseases; the prevalence, transmission, and control of these diseases. Sanitation of water, sewage, food, and air. Community hygiene and public health administration. Mr. Slanetz. Prereq.: Biol. 1-2, or consent of instructor. 3 lec. or demonstrations; 3 cr.

6. Soil Microbiology. The nature and types of bacteria and other microorganisms present in soil and their activities in carrying out decomposition of plant and animal matter; their role in the nitrogen, carbon, and sulfur cycle in soil; their relationship to other soil inhabitants; and their contribution to soil fertility. Mr. Chesbro. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr. (Alternate years; offered in 1963-64.)

8. Pathogenic Microbiology. The morphological, cultural, biochemical, serological, and pathogenic characteristics of microorganisms causing human and animal diseases. Mr. Metcalf. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr.

53. Immunology and Serology. The theories of infection and immunity; production of vaccines, toxins, and antiserums; serological techniques for disease diagnosis and identification of bacteria, including agglutination, precipitin, and complement fixation tests. Mr. Metcalf. Prereq.: Microb. 8. 2 lec.; 2 lab.; 4 cr.

54. Industrial Microbiology. Microorganisms important in industrial processes. Isolation and study of the bacteria, yeasts, molds, and actinomycetes used for the manufacture of industrial products. Discussion of the theoretical aspects of fermentation and respiration and their practical applications. Typical industrial processes employing microorganisms. Mr. Chesbro. Prereq.: Microb. 1 and organic chemistry. 2 lec.; 2 lab.; 4 cr. (Alternate years; not offered in 1963-64.)

55, 56. Problems in Microbiology. Special problems, depending upon the training and desire of the student. Elective only upon consultation. Mr. Slanetz and staff. Credits to be arranged.

57, 58. Microbiology Seminar. Reports and discussions on current literature and recent developments in microbiology. Mr. Slanetz and staff. Prereq.: Microb. 2 or 8 and consent of the instructor. 1 2-hr. period; 1 cr.

60. Virology. The animal and plant viruses including bacteriophages and the rickettsiae. A consideration of techniques, pathogenesis, immunity, and host-virus relationships. Mr. Metcalf. Prereq.: Microb. 8. 1 lec.; 3 lab.; 4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

MUSIC

Karl H. Bratton, *Professor;* Robert W. Manton, *Professor;* Donald E. Steele, *Professor;* John B. Whitlock, *Associate Professor;* Andrew J. Galos, *Associate Professor;* Irving D. Bartley, *Assistant Professor;* John W. Wicks, *Assistant Professor;* Raymond A. Hoffman, *Assistant Professor;* Donald A. Mattran, *Assistant Professor;* John J. Zei, *Assistant Professor;* Paul F. Verrette, *Instructor*

Music Laboratory

Registration for musical organization courses should be completed during the registration period. These courses cannot be used to satisfy major requirements except in the Music-Education Curriculum. *Each participant must be registered for either credit or audit. By permission of instructor.*

1, (1). Band — Techniques & Literature. Open to all students on the basis of individual audition. The Marching Band presents precision performances at home and away football games, pep rallies, and parades. The Symphonic Band studies and performs the finest in band literature and gives concerts on campus and throughout the New England area. Mr. Mattran. Prereq.: Permission of instructor. 2 lab.; 1 cr.

2, (2). University-Community Symphony Orchestra — Techniques & Literature. Open to all students and others on basis of individual tryouts. The orchestra gives several concerts of the finest symphonic literature during the year and also accompanies the vocal groups and solo instrumentalists on various occasions. Membership includes students, faculty, and members of the surrounding communities. Mr. Galos. Prereq.: Permission of instructor. 2 lab.; 1 cr.

3, (3). Women's Glee Club — Techniques & Literature. Open to all students interested in singing the finest literature in this medium and who can fulfill the requirements of a tryout. Recommended for all women voice majors. Mr. Wicks. Prereq.: Permission of the instructor. 2 lab.; 1 cr.

4, (4). Men's Glee Club — Techniques & Literature. Open to all students interested in singing the finest of literature in this medium and who can fulfill the requirements of a tryout. Recommended for all men voice majors. Mr. Zei. Prereq.: Permission of the instructor. 2 lab.; 1 cr.

5, (5). Concert Choir — Techniques & Literature. An advanced choral group devoted to study and performance of the best classical and modern

choral literature. Recommended for men and women voice majors. Mr. Bratton. Prereq.: Permission of instructor. 2 lab.; 1 cr.

7, (7). Ensemble — Techniques & Literature. 1) Brass; 2) Strings; 3) Tudor Singers; 4) Woodwind. Small groups of instrumentalists and vocalists organized to provide advanced students experience in such groups, plus an acquaintance with the more advanced literature in the areas. Prereq.: Permission of instructor. 2 lab.; 1 cr.

8, (8). String Orchestra — Techniques & Literature. Open to all students on basis of individual tryouts. This group appears at all the University-Community Symphony Orchestra concerts. The most select of string compositions are studied and played. 1 rec.; 1 cr. (Not offered in 1963-64.)

A maximum of 8 credits earned in music laboratories may be used toward graduation.

Applied Music

Register for the following courses as Mus. 23, etc.

Lessons in Applied Music are based on ½-hour private instruction per week. One semester hour of credit may be earned with one lesson per week; two semester hours of credit may be earned with two lessons per week. Five one-hour practice periods per credit will be sought out by the music students themselves. The special semester fee for Applied Music is $25 for one lesson a week, and $50 for two lessons a week. These fees include the use of a practice room for the required preparations.

Majors in Applied Music are required to present 16 semester hours in Applied Music taken over a period of four years. Two lessons per week are required each semester. Four semester credits taken in the freshman year are regarded as prerequisite to the Applied Music option.

Registration in Applied Music courses is open to all students in the University, subject to approval by the instructor. A student may register for credit in the same course in successive semesters.

19, 20. Voice Class for Beginners. To develop the basic fundamentals in voice culture, such as breathing, phrasing, diction, pure tone, resonance, posture, and study of vocal solo literature through group activity with some of the finest works of the masters. Permission of the instructor. Mr. Zei. 2 cr.

21, 22. Functional Piano Class. Piano instruction primarily for beginning students in a class. Training in the following subjects will constitute the course: pianoforte techniques and reading of music; keyboard harmony geared to the practical harmonization of grade school melodies; transposition; sight reading; improvisation. Especially for students interested in the Music Education Curriculum. Mr. Steele. Enrollment limited to 8. Permission of instructor. 2 cr.

†23, (23). Piano. The methods of presentation and the material used vary with each pupil and his degree of advancement. With beginners, training is given in the fundamentals of pianoforte technique and in the reading of keyboard music. As early as is practicable, emphasis is placed on

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

musical values, musicianship, and sound piano technique. For this purpose, the literature employed is selected from the masters. Musical understanding is developed and quality of performance is stressed. With the attainment of advanced technique, the student's repertory is broadened to include works of all periods of literature: pre-Bach, J. S. Bach, C. P. E. Bach, Scarlatti, Haydn, Mozart, Beethoven, the romantic composers, the post-romantic, and present-day composers. Mr. Manton, Mr. Steele, Mr. Bartley, and Mr. Wicks. 1 or 2 lessons; 1 or 2 cr.

†24, (24). ORGAN. A thorough foundation in pedal and manual technique, including hymn playing, followed in subsequent semesters by the standard works of Bach, Cesar Franck, Widor, and contemporary composers. Students should be proficient in piano before enrolling for organ. Permission of the instructor is required. Mr. Bartley and Mr. Wicks. 1 or 2 lessons; 1 or 2 cr.

†25, (25). VIOLIN, VIOLA. The choice of literature and method in violin teaching depends entirely on the individual pupil's background and ability, therefore no single course of study is set up as a requirement for all pupils. Emphasis is placed primarily on musicianship and musical values, and the development of a sound, reliable technique is a means to that end. Technique is developed in these lessons not so much through exercise and drill as it is through the best in literature. Mr. Galos. 1 or 2 lessons; 1 or 2 cr.

†26, (26). VOICE. Instruction in voice will seek to develop those qualities which are essential for intelligent interrelations, such as correct posture, breathing, pure tone, resonance, clear enuniciation, and technical facility. Each voice is given the treatment best suited to its individual needs. A higher ideal than the perfection of mere mechanical skill is sought, namely a musicianly style of singing and a thorough appreciation of the best works of the masters, both classic and modern. Mr. Bratton and Mr. Zei. 1 or 2 lessons; 1 or 2 cr.

†27, (27). VIOLONCELLO, STRING BASS. Objectives are based primarily on the student's ability and experience. A general awareness of the instrument as regards technique and tone are the first essential prerequisites. These elements will gradually broaden to include the attention and cultivation of the student's musical perception and repertoire. Mr. Hoffman. 1 or 2 lessons; 1 or 2 cr.

†28, (28). WOODWIND. The technique and literature of clarinet, flute, oboe, bassoon, and saxophone, or any woodwind instrument. Mr. Mattran and Mr. Whitlock. 1 or 2 lessons; 1 to 2 cr.

†29, (29). BRASS. Instruction in any of the following instruments: trumpet, trombone, French horn, baritone, and tuba, or any brass instrument. Correct tone production, articulation, and musical interpretation are stressed. Mr. Whitlock and Mr. Mattran. 1 or 2 lessons; 1 or 2 cr.

†30, (30). PERCUSSION. Snare drum rudiments. The technique, tuning and sticking of the pedal and hand timpani. Cymbals and all other percussion effects (claves, maracas, triangle, tambourine, wood-block, chimes, etc.) glockenspiel, bells, or bell lyre, as well as xylophone. Mr. Whitlock. 1 or 2 lessons; 1 or 2 cr.

---

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

117, 118. Applied Music for Graduate Credit. 1) Piano; 2) Organ; 3) Stringed Instruments; 4) Voice; 5) Woodwind; 6) Brass; 7) Percussion. Further development of technique, music interpretation, performance, and emphasis oriented toward the functional use of the instrument in the schoolroom. Prereq.: Must exhibit sufficient proficiency to warrant graduate study. Permission of the Chairman of the Department and the student's graduate supervisor. Audition required. A student may register for credit in the same courses in successive years with the approval of his major professor. Mr. Bratton and staff. 1-2 cr.

Theory and Composition

*†9-10. Sightsinging, Ear Training, Dictation I. Intensive training in the acquisition of the basic essentials of music. Development of rhythmical sense, the identification and singing of intervals, accurate response to melodic, harmonic, and rhythmical dictation, the basic laws of musical notation, knowledge of scales, and terminology. Mr. Hoffman. 3 labs.; 0 cr.

†11-12. Harmony I. Basic techniques in harmonization in four parts of basses (figured and unfigured) and soprano melodies using triads and their inversions, nonharmonic tones, the dominant seventh and its inversions, and secondary dominants. Attention will also be given to harmonic rhythm and modulation. Harmonic analysis of Bach chorales will be an integral part of this course. Keyboard harmony will also be stressed. Mr. Wicks. Prereq.: Music 9-10. However, if the student has sufficient familiarity with the keyboard to be able to read simple pianoforte music, he should take Music 11-12 in his freshman year along with Music 9-10. In this case, permission of the instructor is required. Mr. Wicks. 2 cr.

†13-14. Sightsinging, Ear Training, Dictation II. An extension of Music 9-10. Further training in basic elements of music. The rhythmical and melodic phenomena of the art, development of acuity and accuracy in perception and response. Mr. Hoffman. Prereq.: Mus. 9-10. 3 lab.; 1 cr.

15-16. Harmony II. Continuation of harmonization techniques developed in Harmony I. The use of irregular resolutions; the diminished 7th; the incomplete major 9th; the complete dominant 9th; the sequence; the nondominant 7th, 9th, 11th, and 13th; the raised supertonic and submediant; the Neapolitan sixths; the four augmented 6th chords; and other chromatically altered chords. Formal and harmonic analysis of preludes in the Well-Tempered Clavier and works of the Classical and Romantic periods. Continued emphasis on keyboard harmony. Mr. Wicks. Prereq.: Mus. 11-12. 2 cr.

†41-42. Conducting Methods — Instrumental and Choral. The development of conducting — physical aspects, equipment of conductor, fundamental gestures and beats, baton techniques. The reading and analysis of full and condensed scores. Essential choral and instrumental conducting techniques, problems of choral organization, psychology of rehearsal. Mr. Galos and Mr. Bratton. 1 cr.

†53-54. Counterponit. First semester: Sixteenth century polyphony based on the sacred choral style of Palestrina, Vittoria, Lassus, and others of this period. Second semester: free instrumental counterpoint based on the

---

* Mus. 9-10 is normally prerequisite to Mus. 11-12, but the two may be taken simultaneously with the approval of the instructor in Mus. 11-12. Qualified students are exempted from Mus. 9-10 when proper notification is furnished the College Dean's Office and the University Registrar.

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

styles of Bach, Handel, and other classic masters. Twentieth century counterpoint will be discussed in the closing classes of the course. Mr. Manton. Prereq.: Mus. 15-16 or permission of instructor. 2 cr.

†59-60. Canon and Fugue. Free counterpoint in three and four parts, double counterpoint, the writing of simple two-part inventions, choral preludes, etc. The canonic and fugal studies will be based largely upon the works of Bach and will have as their objective the composition of a two-, a three-, and a four-voiced fugue. Mr. Manton. Prereq.: Mus. 53-54 or permission of instructor. 2 cr.

†71-72. Composition. The various smaller harmonic forms, the variation, the rondo, and the sonata forms will serve as models for composition. Mr. Manton. Prereq.: Permission of the instructor. 2 cr.

†97-98. Orchestration. Instruments and methods of combining them into coherent arrangements arriving at successful balances for the band and orchestral arranger. The characteristics, range, and tone quality of the instruments are fully covered and transcriptions are made. Orchestral effects are studied. Chorestration is offered during the latter part of the second semester. The techniques of writing for solo voices, for mixed voices, men's and women's voices, are taken up through the medium of arrangements, and original work. Mr. Manton. Prereq.: Permission of the instructor. 2 cr.

History, Literature, and Appreciation

35. Music Appreciation. Intelligent listening through formal analysis of the irreducible minimum of great musical masterpieces. A selection of the most important works of Beethoven, Shubert, Mendelssohn, Chopin, Liszt, Brahms, Franck, Tschaikowsky, d'Indy, and many others analyzed by the students and the instructor and played several times in the classroom. 2 cr. (Special Summer Session course.) (Not offered in 1963-64.)

36. Music Appreciation. Continuation of Music 35. Masterpieces drawn from the works of Palestrina, Bach, Handel, Haydn, and Mozart. Selections will be analyzed by the students and the instructor and played several times in the classroom. Supplementary assigned recordings at the University Library. 2 cr. (Special Summer Session course.) (Not offered in 1963-64.)

37-38. Introduction to Music Literature. A beginning listener's approach to the great music of the ages. Emphasis will be placed not only on the means of acquiring a discerning ear, but also on presenting a broad perspective of music in relation to the history of Western civilization. Mr. Wicks and Mr. Hoffman. 3 cr.

40. Summer Session Chorus and Basic Conducting. A choral group devoted to the study and performance of the best classical and modern choral literature. The basic elements of choral conducting, for elementary and secondary teachers, church choir directors, and those interested in singing. May be taken for credit or as recreation. Mr. Bratton. 1 cr. (Special Summer Session course.) (Offered in 1963-64.)

†43. Survey of Music in America. The development of music in the United States from Colonial times to the present. The various influences,

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

such as the English tradition, the German era, the French impressionistic influence, and finally the quest for an American style with the music of the most representative composers. Mr. Manton. 2 cr. (Alternate years; offered in 1963-64.)

†47, 48. Survey of Pianoforte Literature. The history and development of keyboard literature from Bach to the present. A discussion and performance of the works of Bach, the sonatas and concertos of Haydn, Mozart, Beethoven, Schubert, the Romantic composers, and of contemporary writers. Mr. Steele. 2 cr. (Alternate years; not offered in 1963-64.)

†61. Masters of the Renaissance. Important composers of the fifteenth and sixteenth centuries and their works: Vittoria, Palestrina, Byrd, and others. Mr. Wicks. 2 cr. (Alternate years; not offered in 1963-64.)

†62. Music of the Eighteenth Century. The lives and outstanding works of Bach, Handel, Haydn, and Mozart. Mr. Wicks. 2 cr. (Alternate years; not offered in 1963-64.)

†63. Romantic Music of the Nineteenth Century. The sonata form as a basis for the symphonies, concerti, chamber music, and keyboard works of Beethoven, Berlioz, Schubert, Mendelssohn, Schumann, Brahms, Franck, Chopin, and Liszt. Romantic elements contained in the development of harmony orchestration, sonority, expressive content. The rise of the short piano piece, the German art song, the symphonic poem, nationalism in music. Mr. Steele. 2 rec.; 2 cr. (Alternate years; offered in 1963-64.)

†64. Twentieth Century Music. Music of the twentieth century, including its literature, its trends, and an analysis of techniques, styles, forms, and expression. Mr. Steele. 2 rec.; 2 cr. (Alternate years; offered in 1963-64.)

†(83). The Life and Works of Beethoven. The piano sonatas, symphonic works, and the string quartets. Lectures, analysis, reports, required readings, and listening. Mr. Manton. 2 cr. (Alternate years; offered in 1963-64.)

87-88. Survey of Opera and Oratorio. A historical and musical survey of the opera and oratorio, from their common birth, through the development of each specific form to the present day. Particular stress is given to political and religious influences. Mr. Zei. 2 cr. (Alternate years; not offered 1963-64.)

Music Education

The Department of Music offers a four-year curriculum for teachers of elementary and secondary school music. (See Music-Education curriculum.)

Register for the following courses as Mu-Ed. 90, etc.

55. Choral Methods and Repertoire for the Elementary and High School Teacher. A lecture-workshop course touching upon some of the problems and solutions in the organization and performance of elementary and high school glee clubs and community choirs. Emphasis is placed on techniques of rehearsal, repertory and suitable materials. Mr. Bratton. Prereq.: Permission of the instructor. 2 cr. (Special Summer Session course; not offered in 1963-64.)

---

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

57. Essentials of Music for the Classroom Teacher. A course designed to provide training in the elements and appreciation of music for application to the grade-school classroom situation. Emphasis will be placed on melodic and rhythmical accuracy, basic keyboard harmony, elementary conducting, music literature. Recommended for the grade-school teacher. No performing ability required. Mr. Steele. Prereq.: Permission of the instructor. 2 cr. (Special Summer Session course; not offered in 1963-64.)

90. Problems in the Teaching of Elementary School Music. Aims, scope, and organization of materials and activities in the elementary schools in keeping with modern trends in educational philosophy. The child voice, its care and development. A demonstration of materials and methods for the various grades. Observations of elementary school music. Mr. Whitlcok. Prereq.: Educ. 58. 3 lec.; 1 lab.; 3 cr.

†93. Problems in the Teaching of Secondary School Music. The application of educational principles to the teaching and learning of music, and the organization of the music curriculum on the junior and senior high-school levels. The adolescent voice and the classification of voices; the selection of vocal and instrumental materials to fit the needs of the individual group, in order to insure the maximum growth and musical development of the students; and the building of unified concert programs. Problems of administration and management, and the relationship of the teacher to school and community. Observation of music programs in secondary schools. Mr. Whitlock. Prereq.: Educ. 58. 3 lec.; 1 lab.; 3 cr.

†94. Music Education Seminar. Problems of organizing and administering school orchestras, bands, glee clubs, choruses and small ensembles, such as objectives, motivation, schedule, discipline, equipment, programs, finances, rehearsal techniques, contests and festivals, materials, personnel selection and grades. Mr. Whitlock. 3 cr. (Special Summer Session course; offered in 1963-64.)

†95 (95). Techniques and Methods in Stringed Instruments. Class-teaching of stringed instruments simulating classroom situations and methods. Mr. Galos. 2 cr.

†(96), 96. Techniques and Methods in Woodwind Instruments. Correct tone production and technique of woodwind instruments. Materials and procedures for class and individual instruction. The school band as a concert organization. Mr. Mattran. 3 cr.

†97, (97). Techniques and Methods in Brass and Percussion Instruments. Correct tone production and technique of brass instruments and of rudimentary percussion technique. Materials and procedures for class instruction. Mr. Whitlock. 3 cr.

†98. Music for the Elementary Classroom Teacher. For the non-music specialist interested in utilizing music as a means of enriching children's lives. The correlation and integration of music in the school curriculum and the basic skills and techniques necessary. Also open to music specialists and school administrators. Mr. Whitlock. 3 cr. (Summer Session course.)

Education-Music (Ed-Mu) 93, 94. Supervised teaching in elementary and secondary school music. Prereq.: Mu-Ed 90, 93.

---

† Students majoring in Music or enrolled in the Music-Education Curriculum are required to attend all student and faculty recitals as a part of the assigned work of their program.

99. Music Education Seminar — Instrumental and Choral. A study and discussion of instrumental and choral music methods in the elementary and secondary schools with emphasis given to voice and instrumental classes, as well as the development of music organizations. This seminar is especially designed for classroom music teachers and supervisors of considerable experience. Opportunity will be given the class members to observe the University of New Hampshire Summer Youth Music School organizations during the sixth week. Prereq.: Teaching experience in instrumental and/or choral music. Mr. Bratton and Mr. Whitlock. 3 cr. (Special Summer Session course; not offered in 1963-64.)

OCCUPATIONAL THERAPY

Marguerite Abbott, *Associate Professor;* R. Virginia Bell, *Assistant Professor*

Medical Lecturers:

William Amman, M.D., *Ear, Nose, Throat Conditions;* Arthur DiMambro, M.D., *Orthopedics;* Charles H. Howarth, M.D., *General Medicine, Surgery, and Chest Conditions;* Gerhard Nothmann, M.D., *Community Psychiatry;* Anna Philbrook, M.D., *Medical Psychiatry;* Gerald Shattuck, M.D., *Pediatrics.*

The following courses are for Occupational Therapy students; elective for others by permission of the Department Chairman.

1. Therapeutic Crafts. Therapeutic crafts and skills are selected handicrafts, such as stenciling, copper tooling, bookbinding, fly tying, basketry, cord knotting, papier-mache, and chip carving. Crafts are analyzed relative to their therapeutic suitability for patients. Individual (craft) study projects are introduced, together with the basic methods of presenting activities to patients, by demonstration and return demonstration method. Minimum laboratory fee $3.00-$5.00. Miss Bell. 2 lab.; 3 cr.

2. Therapeutic Crafts, Advanced. Projects and methods in leather work, ½ semester. Graphic arts with emphasis on printing and silk screen techniques, ½ semester. Therapeutic analysis of activities will be introduced. Minimum laboratory fee $10.00-$15.00. Miss Bell. 2 lab.; 3 cr.

41. Survey Course of Occupational Therapy. Survey course of the scope and area of occupational therapy and its functions as a profession. History and philosophy of medicine reviewed, with an emerging O. T. philosophy as a basic frame of reference for the treatment of patients. Films, guest lecturers, and instruction trips to hospitasl and clinics. Miss Abbott. 2 cr.

42. Application of Occupational Therapy Treatment to General Medicine and Surgery. Also includes cardiac and chest conditions. Special problems of sensory disturbances are presented. Conditions of special significance with pediatrics and geriatrics discussed. Miss Abbott and Miss Bell. 2 cr.

44. Application of Occupational Therapy to Psychiatric Conditions. Principles of dynamics as applied by occupational therapy to assist in establishing an atmosphere conducive to recovery (containing minimal anxiety and maximum support) by utilizing individual and group activity programs. Miss Bell. 2 cr.

46. Application of Occupational Therapy to Physical Disabilities. Techniques used in treating patients with orthopedic and neurological conditions. Cerebral palsy, poliomyelitis, and degenerative neurological conditions are presented and discussed, upon the basic principle of the application of therapeutic exercise to these conditions; to improve joint motion or muscle power; to develop coordination and improve the neuromuscular pattern of movement; and to assist the patient in adjustment, by building up a wholesome psychological climate conducive to recovery. Films, guest lecturers, demonstrations. Miss Abbott. Prereq.: O.T. 42, 49, 50. 2 cr.

48. Administration and Organization for Hospital and Agency Community Work. The general principles of organization and administration, which include a body of knowledge of group dynamics, supervisory practices, including employer-employee relationships, personal policies, layout of O.T. physical plants, floor plans, purchasing, and various methods of inventory. Miss Abbott. 2 cr. (Not offered in 1963-64.)

49. General Medical Lectures. Etiology, pathology, symptoms, and treatment of general medicine, surgery, and chest diseases; sensory disturbances, ophthalmology, otology; overview of pediatric disabilities and common childhood diseases. Films. Dr. Charles H. Howarth, Dr. William Amman, Dr. Gerald Shattuck. 3 cr.

50. Orthopedic Medical Lectures. Etiology, pathology, symptoms, and treatment of orthopedic conditions. Films. Dr. Arthur DiMambro. 2 cr.

51. Psychiatric Medical Lectures. A basic course in medical psychiatry, including both child and adult psychiatric conditions. Etiology, symptomology, prognosis, and medical treatment of the psychoneurosis, functional psychoses, the organic reaction types, plus the various types of drug therapy, currently in use. Films. Dr. Anna Philbrook. 2 cr.

56. Advanced Reading Seminar. A conference-seminar to assist the senior O.T. student to integrate the knowledge and skills he has acquired. Administration, including floor plans, purchasing, and inventory, will be studied. The student is put into contact with a variety of ideas and modalities of social psychological-medicine, forming a frame of reference for a philosophy of professional O.T. Ideas, methods, and techniques are integrated by experts in the humanities and medicine, by way of the seminar conference method. This will be followed by a plan of integrated independent study in a specific field of study, of *one* and not more than *two* fields of the student's major O.T. interest. A final thesis will be required. Miss Abbott. 2 cr. (Not offered in 1963-64.)

92. Clinical Affiliation in General Medicine, Surgery, Pediatrics, and Tuberculosis. Full time — three months. No credit.

93. Clinical Affiliation in Psychiatry. Full time — three months. No credit.

94. Clinical Affiliation in Physical Disabilities. Full time — three months. No credit.

Note: *All occupational therapy affiliation fees must be paid prior to entering any affiliation, starting either in the summer following the junior year or after the senior year.*

ROBERT W. JORDAN, *Professor;* DONALD C. BABCOCK, *Professor Emeritus;*
ASHER MOORE, *Professor;* PAUL BROCKELMAN, *Instructor*

3. LOGIC. An introduction to the principles of good reasoning, including practice in their application. The correct use of language, the logical structure of arguments, the detection of fallacies in reasoning, and the nature of scientific method. Mr. Brockelman. Open to all students. 3 cr.

(5). INTRODUCTION TO PHILOSOPHY. An examination of representative philosophies and of some of the persistent problems of philosophy. An introductory course designed to acquaint the student with the nature of philosophy and to help him think about his experience philosophically. Mr. Moore. Open to all students. 3 cr.

(8). PHILOSOPHY OF HUMAN NATURE. A study of representative views of the nature of man, such as the alternatives proposed by theism, naturalism, and existentialism, and with particular attention to some of the fundamental problems of ethics, such as duty and happiness, freedom and responsibility, individualism and authority. Readings from traditional and contemporary philosophical literature and from the literature of the social sciences. Mr. Jordan. Open to all students. 3 cr.

21, 22. HISTORY OF PHILOSOPHY. The history of Western philosophy through the study of the major figures and movements from the early Greek philosophers to the nineteenth century. Mr. Jordan. 3 cr. Philosophy 21, 22 replaces Philosophy 1, 2 and may not be taken for credit by students who have passed Philosophy 1, 2.

Students who are interested in advanced work in philosophy should take Philosophy 21, 22 as early as possible. This course is not ordinarily open to freshmen, but freshmen who expect to major in philosophy or who intend to take advanced work in philosophy may elect the course by securing the permission of the instructor. Students who wish to register for Philosophy 22 without having taken Philosophy 21 must secure the permission of the instructor.

24. MEDIAEVAL PHILOSOPHY. The philosophic thought of the Middle Ages from Augustine to Scotus but with particular emphasis upon the writings of St. Augustine and St. Thomas Aquinas. Mr. Brockelman. Prereq.: Philosophy 21 or permission of the instructor. (Not open to freshmen.) 3 cr. (Alternate years: offered in 1963-64.) Philosophy 24 replaces Philosophy 64 and may not be taken for credit by students who have passed Philosophy 64.

25. PHILOSOPHY OF RELIGION. A philosophical study of the nature and significance of religious experience, with historical and systematic analysis of such traditional problems of philosophical theology as faith and reason, evil, and the existence of God. A part of this course will consist of an intensive phenomenological study of the religious experience and an attempt to deal with the traditional problems from this point of view. Mr. Brockelman. (Not open to freshmen.) 3 cr. Philosophy 25 replaces Philosophy 54 and may not be taken for credit by students who have passed Philosophy 54.

(26). AESTHETICS. An examination of representative theories concerning the nature of art and aesthetic experience. Mr. Jordan. (Not open to freshmen.) 3 cr. (Alternate years; not offered in 1963-64.) Philosophy 26 replaces Philosophy 65 and may not be taken for credit by students who have passed Philosophy 65.

27. Ethical Theories. A study of the problems of moral philosophy through the critical examination of important traditional and contemporary theories of ethics. Mr. Brockelman. (Not open to freshmen.) 3 cr.

28. Social and Political Philosophy. An examination of the distinctively philosophical problems encountered in social and political philosophy through the study of representative figures in the history of this branch of philosophy. An essential aim of this course will be to bring the student to serious and intensive reflection upon his own social and political philosophy. Mr. Brockelman. (Not open to freshmen.) 3 cr.

52. Philosophy through Literature. A study of the philosophical implications of representative literary works with particular emphasis on recent and contemporary literature. Mr. Jordan. 3 cr. (Alternate years; not offered in 1963-64.)

55. Analytic Philosophy. A study of analytic philosophy, its roots in the nineteenth century, its relation to science, and its development to the present day. The application of the analytic method to the solution of philosophic problems. Readings from such recent and contemporary figures as Russell, Wittgenstein, Ayer, Carnap, and Ryle. Mr. Brockelman. Prereq.: Philosophy 21, 22. 3 cr. (Alternate years; not offered in 1963-64.)

56. Existentialism. A study of existentialism, its roots in the nineteenth century, its relation of phenomenology, and its development to the present day. Readings from such recent and contemporary figures as Sartre, Marcel, Heidegger, and Jaspers. Mr. Brockelman. Prereq.: Phil. 21, 22. 3 cr. (Alternate years; offered in 1963-64.)

58. Philosophy of Science. A discussion of various philosophical problems raised by science. For example: induction and probability, the nature of law, the significance of statistical techniques, the purpose and general principles of experimental design, theory construction, operationism, the nature of mathematics and its application in science, the place of speculation in science, the unity of science, special problems of the biological and social sciences. The relation of science to ethics, the humanities, and everyday life. Mr. Brockelman. 3 cr. (Alternate years; not offered in 1963-64.)

89. (89). Studies in the History of Philosophy. Intensive study of individual philosophers, important movements, schools, or periods in the history of philosophy. Subjects and instructors to be announced each year. Prereq.: Philosophy 21, 22. Lectures, lectures-discussion, or seminar. 3 cr. Barring duplication of subject this course may be repeated for credit. *Subjects for 1963-64:* Fall Semester: *Nineteenth Century Philosophers.* Mr. Moore. Spring Semester: *Plato.* Mr. Jordan.

90. Topics in Systematic Philosophy. Intensive study of selected problems of philosophy in such areas as epistemology, metaphysics, and theory of value. Topics and instructors to be announced each year. Prereq.: Phil. 21, 22. Lectures, lectures-discussion, or seminar. 3 cr. Barring duplication of subject this course may be repeated for credit.

99. (99). Individual Study. Students who are adequately prepared to do independent work involving extensive reading and writing may do advanced work on an individual basis. Before registering for this course the student must formulate a project and secure the consent of a member of the department who will supervise his work. Conferences and/or written work as required by the supervisor. Credits to be arranged.

PHYSICAL EDUCATION FOR MEN

Carl Lundholm, *Director and Professor of Physical Education and Athletics;* Paul C. Sweet, *Professor;* Clarence E. Boston, *Associate Professor;* E. William Olson, *Associate Professor;* A. Barr Snively, Jr., *Assistant Professor;* Edward J. Blood, *Assistant Professor;* Andrew Mooradian, *Assistant Professor;* Theodore W. Conner, *Instructor;* F. William Haubrich, *Instructor*

Requirements. Physical Education is required of all freshman men students and first-year students in the Thompson School of Agriculture. Each student must provide himself with an activity suit consisting of gray sleeveless jersey, gray trunks, white woolen socks and rubber-soled tennis or basketball shoes. This suit must be worn at all classes in physical education.

31, 32. Physical Education. Development of the organic system generally; stimulation of the neuromuscular system through physical activity; encouragement of a proper attitude toward play; development of an appreciation of physical activities as worthwhile leisure-time recreation. *Required of freshmen.* 2 periods; ½ cr. Students passing will get grade of cr.

Teacher Preparation Courses

Required of students registered in the Physical Education Teacher Preparation Curriculum for Men. Elective for other students who are preparing to teach an academic subject as indicated by taking Ed. 41 and planning to take Ed. 57-58.

23. Principles of Physical Education. The aims, objectives, and principles of physical education and the historical factors which have influenced the physical life of nations. Mr. Conner and Miss Browne. 3 cr.

45. Football. A history of football with consideration of its educational implications and an analysis of the various systems of play. Instruction in team and individual offensive and defensive fundamentals. The rules, theory, strategy, generalship of team play, and the responsibilities of the coach for the physical welfare of the team. Mr. Boston. 1 lec.; 2 lab.; 2 cr.

46. Baseball. Theoretical and practical consideration of the basic principles of batting and fielding; the fundamentals of each position; special stress on problems involving team play, coaching methods, physical conditioning, and rules; a history of the game with a consideration of its educational values. 1 lec.; 2 lab.; 2 cr.

47. Track and Field Athletics. Instruction and practical demonstrations in starting, sprinting, middle distance and distance running, relay, racing, hurdling, high and broad jumping, pole vault, shot putting, discus, hammer and javelin throwing. Methods of preparing contestants for the various events. Mr. Sweet. 1 lec.; 2 lab.; 2 cr.

48. Basketball. History of basketball with a consideration of its educational values. Theory and practice in the fundamentals of individual offense and defense. The various styles of team offense and defense and rules of the game. Problems in handling and conditioning a team. Mr. Olson. 1 lec.; 2 lab.; 2 cr.

61. Problems of Teaching in Physical Education. Methods and materials of instruction, theories of play, and actual practice for the successful teaching of recreational activities in school, in the playground, and in the community. Studies of activities adapted to different levels of maturity. Mr. Lundholm. 3 cr.

63. Care and Prevention of Injuries. Nature and causes of injuries incident to physical activities, the common hazards of play, and preventive measures for children and athletes are discussed. First aid principles are presented. Elective for seniors who have taken one of the following: P.E. 45, 46, 47, 48. Mr. Blood. 2 lec.; 2 cr.

65. Administration of Physical Education in Secondary Schools. The aims and objectives of health and physical education. Organization and supervision of a complete unified program of health and physical education including the legal aspects, intra-mural and inter-scholastic athletics, medical problems, budgeting, financing, maintenance of equipment, publicity programs, and office management. Each student will be given an opportunity to serve on a committee to draw up an original program of health and physical education in a theoretical or actual situation found in some secondary school. Prereq.: Zool. 17-18; P.E. 23 and 61; and two courses in the coaching of sports. These last may be taken concurrently. Mr. Olson. 3 lec.; 3 cr.

93, (93). Education-Physical Education (Ed-PE). Directed Teaching in Physical Education. Given in the Department of Physical Education and Athletics for Men. Prereq.: Zool. 17-18; P.E. 23 and 61. The student must have completed the methods course in the sport which he is directing or take the course concurrently. Mr. Mooradian. 6 lab.; 3 cr.

PHYSICAL EDUCATION FOR WOMEN

Marion C. Beckwith, *Director and Professor of Physical Education for Women;* Evelyn Browne, *Associate Professor;* Caroline S. Wooster, *Associate Professor;* Barbara K. Newman, *Associate Professor;* Joan T. Stone, *Assistant Professor;* Janet Atwood, *Assistant Professor;* Marilyn D. Tavares, *Assistant Professor;* Harriet F. Belford, *Instructor*;* Nancy B. Gilbert, *Instructor;* Jorunn Buzzi, *Instructor*

The Department of Physical Education for Women aims to develop in each individual the physical, social, and mental qualities which will enable her to meet successfully the demands of modern society. The course includes recreational and leisure-time activities, vigorous team sports and gymnastics, rhythmic and dance activity, and the opportunity to participate in club activities which are provided primarily for the more highly skilled. This program is supplemented by the extra-curricular competition sponsored jointly by the Women's Recreation Association and the Department.

Requirements. All women students are required to complete at least one credit of physical activity for each of the first four semesters they attend the University. Freshmen women should register for P.E. 1, 2; sophomores for P.E. 3, 4. A second activity may be elected each semester for additional credit (P.E. 11, 12, 13, 14, etc). Unless there is an elementary *and* an intermediate section, the same activity shall not be credited more than twice.

* On half-time.

Physical Examination. Each student must, before entering, have had a physical examination by a physician. A posture test will be given by the Physical Education staff. Individual gymnastics is required of each freshmen whose physical condition indicates this need. Students with physical disabilities must follow the same procedure as other students including registration for physical education. In most cases, modified activities are recommended by the University Physician.

Motor Ability Tests. All students are expected to take the Humiston Motor Ability Test the fall that they enter the University.

Advanced Instruction. To provide for the more highly skilled student and to encourage the interest and ability of the less skilled, the Department includes in its program numerous club and other activities in which advanced instruction is given by a member of the teaching staff. Membership: Open to any University student. Qualifications: Club standards or membership requirements of group.

Clubs and Instructor: Dance Club — Miss Tavares; Rifle Club — Miss Browne; Durham Reelers — Mrs. Jean Tufts; Skating Club — Miss Tavares; Ski Club — Miss Newman; W.R.A. — Mrs. Gilbert and staff. A Riding Club is also available — Mr. Kimball, Instructor, Animal Science Department.

Women students following any Teacher Training curriculum are urged to elect for required Physical Education the following activities: folk dancing, recreation workshop, volleyball, hockey, basketball, and American country dancing.

Required Costume, Fees and Equipment. Special gymnasium uniforms consist of blue cotton tennis-type dress and shorts, white socks, and regulation gymnasium sneakers. Students are required to furnish their own individual equipment for such activities as tennis, skiing, and skating. Equipment is furnished for golf, fencing, badminton, hockey, archery, lacrosse, riflery, and softball. The special riding fee is $35 a quarter for two periods a week.

1, 2, 3, 4. Physical Education. Students should register for one activity from the list below. Freshmen must take fundamental movement during the first semester. 3 hrs.; 1 cr.

(2), (3), (4). Physical Education. The parenthesis indicates a first semester course taken second semester and vice versa; this is for transfer students and for those who have failed. See description above. 3 hrs.; 1 cr.

Activity Courses

(elect one each quarter)

First Quarter: Apparatus, archery (elem. + inter.), badminton, fundamental movement, golf (elem. + inter.), modern dance, hockey, individual gym, riding* (beg. + inter. + colt training), speed ball, swimming (majors), tennis (elem. + inter.).

Second Quarter: Basketball, badminton (elem. + inter.), fencing, folk dancing, fundamental movement, gymnastics, modern dance (elem. + inter.), individual gym, riding* (beg. + elem. + inter. + colt training), riflery, figure skating (beg. + inter.), skiing (beg.), recreation workshop, stunts and tumbling.

---

* See Required Costume, Fees and Equipment.

Third Quarter: American country dance, badminton (elem. + inter.), dance composition, elementary games, fencing, individual gym, modern dance (elem. + inter.), riding* (beg. + elem. + inter. + colt training), riflery (elem. + inter.), figure skating (beg. + inter.), skiing (beg. + elem. + inter. + ad.), recreation workshop, stunts and tumbling, volleyball.

Fourth Quarter: Archery (elem. + inter.), outdoor education, modern dance (elem. + inter.), individual gym, lacrosse, riding* (beg. + elem. + inter. + colt training), softball, swimming (majors), tennis, (elem. + inter.).

Required of freshmen and sophomores. 3 periods; 1 cr.

5, 6, 7, 8. Physical Education. Elective courses for juniors and seniors. Elect from activity courses listed above. 3 hrs.; 1 cr.

11, 12, 13, 14, 15, 16, 17, 18. Physical Education. Additional elective courses open to freshmen, sophomores, juniors, and seniors respectively may be chosen from the Activity Courses listed under P.E. 1, 2, 3, 4. 3 hr.; 1 cr.

Theory Courses

23. Principles of Physical Education. The aims, objectives, and principles of physical education and the historical factors which have influenced the physical life of nations. Mr. Conner and Miss Browne. 3 cr.

24. Organized Camping. The methods, objectives, and purposes of organized camping; standards, facilities, equipment, food, sanitation, health, and safety requirements; program planning and leadership qualifications; integration of camping in the public schools; basic outdoor living skills. Mrs. Wooster. Elective for sophomores, juniors, and seniors (by permission of instructor). 3 cr.

(36). Recreation Leadership. History, trends, community organization, financial aspects of administration, program planning, and leadership of community recreation, including playgrounds. Principles and philosophy of recreation. Mrs. Gilbert. Elective for sophomores, juniors, and seniors. 3 cr.

53, 54. The Theory of Teaching Dance. A survey of methods, materials, and techniques in teaching dance. Includes instruction in performance and teaching of rhythms, social, folk and square dance, first semester; modern dance, second semester. Miss Tavares. Prereq.: concurrent with second quarter: folk and square dance; concurrent with third quarter: modern dance (elem.); concurrent with fourth quarter: modern dance (inter.). Open to Physical Education majors or by permission of instructor. 2 lec.; 1 lab.; 2 cr.

55. Remedial Gymnastics. The adaption of exercise to individual needs, capacities, and limitations; causes and treatment of physical abnormalities. Theory and technique of massage. Mrs. Wooster. Prereq.: Zool. 17-18; Zool. 19 or concurrently. 2 lec.; 2 lab.; 3 cr.

56. Health Education. A general health course designed to acquaint the student with methods, materials and principles of teaching school health. First aid, safety education, health examination, and recognition and prevention of disease. Open to Physical Education majors and others by permission of instructor. Prereq.: Zool. 17. 3 cr.

* See Required Costumes, Fees and Equipment.

63, 64. The Theory of Teaching Team Sports for Women. The methods involved in the teaching of team sports and lead-up games with emphasis on coaching methods and techniques of officiating. Discussion of equipment, history, tactics, and rules of each sport. Miss Stone. Prereq.: Elementary courses in team sports. 2 lec.; 1 lab.; 2 cr.

(66). Administration of Physical Education in Secondary Schools. Administrative methods in the conduct of physical education, health education, and recreation. The planning of programs and policies in the light of past and present philosophies and in regard to current programs, facilities, equipment, selection of staff, and public relations. Miss Browne. 3 cr.

68. Measurement Procedures in Physical Education. The study of procedures used in the selection, administration, construction, and use of motor skill, knowledge tests, and evaluation methods in the field of physical education. Miss Newman. Prereq.: P.E. 63-64 or concurrently, or permission of instructor. 2 or 3 cr.

73, 74. The Theory of Teaching Individual Sports for Women. The methods and principles involved in the teaching of tennis, badminton, bowling, skiing, skating, golf, and archery. The history, equipment, courtesies, rules, techniques, and strategy of each sport will be discussed. Miss Atwood and Miss Beckwith. Prereq.: Elementary work in the courses listed above. Open to junior and senior majors or others by permission of instructor. 1-2 lec.; 1-2 lab.; 1-2 cr.

P.E.-Ed. 91. Problems in the Teaching of Physical Education for Women. The methods, materials, and organization of a comprehensive program of activities for use primarily in the elementary school and in recreation programs. An elementary unit on testing and measurement procedures at various age levels is included. Miss Newman. Prereq.: Elementary games or its equivalent. 3 cr.

Ed-P.E. (92), 92. Directed Teaching of Physical Education for Women. Opportunity for teaching physical education activities under direction, primarily in the elementary and secondary schools. Miss Newman. Prereq.: P.E.-Ed. 91 or concurrently. 1 lec.; 2-5 hr. lab.; 6 cr.

Ed-P.E. (96), 96. Recreation Field Work. Opportunity for participation in the planning and operation of a variety of recreation programs, under direction, in nearby clubs and community centers. Prereq.: P. E.-Ed. 91 or concurrently. Mrs. Gilbert. 1 lec.; 2-5 hr. lab.; 6 cr.

PHYSICAL SCIENCE

(See Geology and Geography)

PHYSICS

HARRY H. HALL, *Professor;* HORACE L. HOWES, *Professor Emeritus;* JOHN A. LOCKWOOD, *Professor;* DAVID G. CLARK, *Associate Professor;* EDWARD L. CHUPP, *Associate Professor;* JOHN E. MULHERN, JR., *Associate Professor;* LYMAN MOWER, *Associate Professor;* ROBERT E. HOUSTON, JR., *Associate Professor;* LAURENCE J. CAHILL, JR., *Associate Professor;* SIDNEY R. BUTLER, *Assistant Professor;* ROBERT H. LAMBERT, *Assistant Professor;* JOEL E. HENKEL, *Instructor;* JOHN R. MORRIS, *Instructor*

1-2. INTRODUCTORY PHYSICS. A broad survey of both classical and modern physics, designed to enable the student to appreciate the role of physics in our society. The main emphasis is on the fundamental laws of nature upon which all science is based. This includes such topics as the conservation laws, structure of matter, relativity, atomic and nuclear phenomena, and elementary particles. (A student who decides to major in physics in the College of Liberal Arts may substitute this course for Physics 18 with the permission of the department.)

9. ELEMENTARY PHYSICS. An elementary course with emphasis on selected topics from the various fields of physics. A knowledge of high school algebra and plane geometry is a prerequisite. Open only to students in the College of Agriculture. 1 lec.; 2 rec.; 1 lab.; 4 cr.

18. GENERAL PHYSICS I. Fundamental concepts of physics. This is Part I of a three-part sequence, of which Parts II and III are selected topics chosen for deeper and more rigorous treatment. Prereq.: Math 21 or 25 passed, or taken concurrently. Should be taken as the introductory course for Physics majors in the College of Liberal Arts*; cannot be counted for major credit. 2 lec.; 2 rec.; in alternate weeks one of the recitations is a laboratory exercise; 4 cr.

23, 24. GENERAL PHYSICS II, III. Selected topics from kinematics and dynamics, kinetic theory, electrostatics, electromagnetism, wave motion, relativity, and quantum theory. Prereq.: Phys. 18 or Phys 1-2, Math. 22 or 26. Must be taken as the introductory course for Physics majors in the College of Liberal Arts; cannot be counted for major credit. 2 lec.; 1 rec.; 1 lab.; 4 cr.

31-32. PHYSICAL MECHANICS. An analytical treatment of classical mechanics covering the methods of statics and dynamics of particles and rigid bodies, both in a plane and in space, and the application of these methods to physical problems; oscillations; constrained motion; generalized co-ordinates and Lagrange's Equations. Prereq.: Phys. 23, 24, Math. 51-52 passed or taken concurrently. 3 lec.; 4 cr.

35-36. EXPERIMENTAL PHYSICS I AND II. Experiments in optics, heat, electricity and magnetism, and atomic physics. Prereq.: Phys. 31-32, 83-84, taken concurrently. Phys. 35: 2 lab.; 1 lec.; 3 cr. Phys. 36: 2 lab.; 2 cr.

37. MODERN PHYSICS. An introduction to twentieth century physics, including the structure of atoms and nuclei, basic ideas of quantum mechanics and solid state theory. Prereq.: Phys. 23, 24, Math. 23, 24. 3 lec.; 3 cr.

38. PHYSICAL ELECTRONICS. An introductory course in basic electronic phenomena, covering such topics as elementary circuit theory, electron

---

* See description of Liberal Arts Physics major, page 78.

emission, vacuum tube characteristics, vacuum tubes as circuit elements, and gaseous discharge. 3 lec.; 3 cr.

81. Physical Optics. Starting with Maxwell's Equations and covering the nature of light, interference, diffraction, polarization, and related phenomena. Prereq.: Phys. 83-84 taken concurrently, Math. 24. 3 lec.; 3 cr.

83-84. Electricity and Magnetism. Foundation of electromagnetic theory, including electrostatics, dielectric theory, electromagnetism, magnetic properties of matter, alternating currents, Maxwell's field theory, and an introduction to electrodynamics. Prereq.: Phys. 23, 24; Math. 51-52 passed or taken concurrently. 4 cr.

91. Atomic Physics. An introduction to quantum mechanics with applications to atomic and molecular spectra. Prereq.: Phys. 83-84. 4 cr.

92. Nuclear Physics. Natural radioactivity, nuclear reactions, nuclear scattering, models of the nucleus, high energy nuclear physics, cosmic rays. Prereq.: Phys. 91. 4 cr.

95-96. Experimental Physics III-IV. Work of research type. Special problems are assigned to the individual student. Prereq.: Senior standing in Physics. 2 lab.; 4 cr.

97-98. Physical Colloquium. Participation in departmental colloquium, reading, and study. Prereq.: Senior standing in Physics. 1 cr. May be taken more than once.

99. Special Topics. Any selected topics not sufficiently well covered in a general course. Prereq.: Math. 51-52 passed or taken concurrently, and senior standing in Physics. 1, 2, or 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

POULTRY SCIENCE

Winthrop C. Skoglund, *Professor;* Richard C. Ringrose, *Professor;* William R. Dunlop, *Professor;* Alan C. Corbett, *Associate Professor;* Walter M. Collins, *Associate Professor;* Samuel C. Smith, *Assistant Professor;* Richard Strout, *Assistant Professor*

(2.) Poultry Production. The general principles of poultry husbandry and their practical application. Factors of culling, breeding, housing, feeding, marketing, diseases and parasites, incubation, and management. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr.

3. Avian Biology. The anatomy, physiology, and endocrinology of the fowl. Mr. Strout. 2 cr. (Alternate years; not offered in 1963-64.)

4. Poultry Selection and Reproduction. The theory and principles involved in selection of poultry, embryonic development, and incubation and brooding practices. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1963-64.)

6. Poultry Nutrition. The principles of feeding: analysis of recent experimental work and current feed problems. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1963-64.)

7. Poultry Housing. Design and construction of poultry houses and equipment; costs of materials; management principles. Mr. Skoglund. 1 lec.; 1 lab.; 2 cr. (Alternate years; not offered in 1963-64.)

17. Poultry Judging. Advanced training in poultry selection. A judging team participates in an intercollegiate contest. Mr. Collins. 1 lab.; 1 cr.

19. Poultry Marketing. The preparation of poultry and eggs for market. Egg qualities and grades, candling and packaging; egg and poultry market conditions; practical instruction in processing poultry for market. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1963-64.)

24. Turkey Production. The general principles involved and their application to the production of market turkeys. Mr. Ringrose. 2 cr. (Alternate years; offered in 1963-64.)

26. Poultry Management. The application of successful business principles to poultry farming; study of surveys and production costs. Visits are made to numerous poultry farms in order to study various types of enterprises. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1963-64.)

27, 28. Poultry Seminar. Students abstract experimental data and report on various current topics. Department staff. 1-hour conference; 1 cr.

29. Poultry Breeding. The principles of Mendelian and quantitative genetics applied to breeding for egg and meat production; genetic and environmental variation; selection, analysis of current breeding systems. Mr. Collins. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered in 1963-64.)

51-52. Avian Diseases. A survey of the diseases of domestic and wild fowl. The first semester, emphasizing the fundamentals of disease control, deals with etiology and diagnosis of bacterial and fungus diseases. A study is also made of the important helminth and protozoan parasites of fowl. The second semester is concerned with those avian diseases caused by virol entities and the nature cultures will be conducted in the laboratory. Mr. Corbett, Mr. Dunlop, and Mr. Strout. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1963-64.)

53, 54. Investigations In:

a. Poultry Breeding — Mr. Collins
b. Poultry Nutrition — Mr. Ringrose
c. Poultry Management — Mr. Skoglund
d. Avian Microbiology — Mr. Dunlop, Mr. Smith, Mr. Strout, Mr. Corbett

Elective only after consultation with the instructor in charge. Hours to be arranged. 1 to 3 cr. Course may be repeated for credit.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

PSYCHOLOGY

EUGENE S. MILLS, *Professor;* HERBERT A. CARROLL, *Professor Emeritus;* GEORGE M. HASLERUD, *Professor;* BRIAN R. KAY, *Associate Professor;* STANLEY I. BERGER, *Assistant Professor;* WALTER R. DURYEA, *Assistant Professor;* VINCENT J. TEMPONE, *Instructor;* FREDERICK M. JERVIS, *Lecturer;* ROBERT G. CONGDON, *Lecturer;* WILLIAM W. LOTHROP, *Lecturer*

1, (1). GENERAL PSYCHOLOGY. The systematic study of human behavior, especially with reference to the fundamental principles governing the development of the individual, motivation, emotion, learning, perception, thinking, and individual differences. Mr. Haslerud, Mr. Kay, and Mr. Berger. Not open to juniors and seniors of the College of Liberal Arts. 3 cr. *This course cannot be counted for major credit.*

32. INDUSTRIAL PSYCHOLOGY. A survey of the applications of psychology to business and industry. Communication and human relations, accident prevention, conditions of work, human engineering, motivation of workers, and an introduction to recruitment, selection, and training of personnel. Mr. Kay. Prereq.: Psych. 1 or the permission of the instructor. Not open to freshmen. 3 cr.

37. DEVELOPMENTAL PSYCHOLOGY. Man's behavioral and psychological development and their relation to physical growth. Phylogenetic and ontogenetic development is examined and pertinent animal studies are introduced. The prenatal period is considered along with childhood, adolescence, and early maturity. The developmental methods of study are also an integral part of the course. Not open to freshmen. Mr. Duryea. 3 cr.

44. PSYCHOLOGY OF PERSONALITY. An exploration into the meaning of the normal personality as seen in current psychological perspective. Expressive traits, perceptual orientations, and motives are viewed as interacting components of the personality structure. Case histories, personality tests, and experiments are employed as study methods. Mr. Duryea. Prereq.: Psych. 1 or 37 or 47. Not open to freshmen. 3 cr.

47, (47). MENTAL HYGIENE. An examination of the fundamental emotional satisfactions desired by human beings and a consideration of the several ways in which these desires are thwarted. The mental conflicts growing out of such thwartings and ways of resolving them will be the central theme of the course. Specific applications of the principles of mental health will be made to the problems of college students. Mr. Berger, Mr. Congdon, and Mr. Lothrop. Not open to seniors in the College of Liberal Arts. 3 cr. *This course cannot be counted for major credit.*

54. PSYCHOPATHOLOGY. A systematic examination is made of the more severe behavioral disorders as found in the major forms of the neuroses and psychoses. The ego defense mechanisms and the construct of anxiety are seen as central to the understanding of these disorders. The search for causes, the interpretation of symptoms, and the methods of treatment are considered in detail. Mr. Berger. Prereq.: Psych. 47. 3 cr.

57. EXPERIMENTAL PSYCHOLOGY. A study of experimental methods in psychology, including discussion of theory and practices in applying these methods to a variety of psychological phenomena. Each student in the class will be responsible for an individual experimental project. Mr. Haslerud and Mr. Duryea. Prereq.: Psych. 1. 2 lec.; 1 lab.; 3 cr.

58. PSYCHOLOGY OF LEARNING. A study of the experimental support for and the practical implications of contemporary theories of learning. Mr. Haslerud. Prereq.: Psych. 1. 3 cr.

60. Psychology of Motivation. A study of the drives and motives which underlie normal human behavior and the forms of adjustment which arise when motives conflict or encounter external frustration. Mr. Mills. Prereq.: Psych. 1. 3 cr.

63. Differential Psychology. A study of individual differences with special attention given to those who are intellectually gifted or mentally retarded. Prereq.: Psych. 1 or permission of instructor. Mr. Lothrop. 3 cr.

67. Statistics in Psychology. A study of the problems and methods involved in the statistical treatment of quantitative data in psychology. The computation and interpretation of elementary statistical measures such as mean, median, standard deviation, and the various methods of correlation are considered in detail. Mr. Duryea. Prereq.: Psych. 1. 3 cr.

77. Comparative Psychology. Consideration of similarities and differences in behavior of infra-human organisms at different phylogenetic levels as aids to understanding how behavior evolved and to the clarification of behavior principles. The historical and biological foundations of such special topics as instinct, consciousness, abnormal behavior, social influence, reasoning and judgment are surveyed by use of the comparative method. Mr. Duryea. Prereq.: Psych. 1. 3 cr.

78. Physiological Psychology. A study of the relation between behavior and the structure of the organism. Special attention to the sensory, nervous, and glandular functions as the organic base for motivation, emotion, learning, etc. Mr. Haslerud. Prereq.: Psych. 1. 3 cr.

82. Social Psychology of Industry. The exploration of social structure and function of industrial organizations. Emphasis will be placed on leadership, role, and organization theories and a critical evaluation of their supporting experimental evidence. Mr. Kay. Prereq.: Psych. 1. 3 cr.

83. Systematic Psychology. The complex expansion of contemporary psychology as seen in historical perspective. A consideration of some of the major antecedents in philosophy, theology, and the physical sciences. Emphasis is placed on the subsequent extensive development of psychology in the United States in the form of complementary schools and systems of thought and research. Mr. Mills. Prereq.: Psych. 1. 3 cr.

89. Mental Hygiene in Teaching. A study of the fundamental needs of human beings, with emphasis on the mental and emotional conflicts of secondary-school students arising from the thwarting of these needs. Ways of recognizing these conflicts by their manifestations, and of helping students to resolve them will be treated extensively in the course. Attention will also be given to the mental hazards of the teaching profession. Mr. Jervis. Prereq.: Senior or graduate status in Psychology or Education. 3 cr. *Not open to students who have completed Psych. 47.*

93, (93). Special Topics in Psychology. This course will be taught by a different instructor each year. The instructor will present advanced material in an area in which he has developed specialized knowledge through research and special study. Students may repeat the course but they may not duplicate areas. Instruction may be given in any one of the following: (A) Clinical, (B) Developmental, (C) Differential, (D) Experimental, (E) Industrial, (F) Learning and Perception, (G) Personality, (H) Physiological, (I) Psychological Evaluation, (J) Psychopathology, (K) Statistics, (L) Systematic. Prereq.: 12 semester credits in Psychology and permission of instructor. 3 cr.

95. The Integrating of Psychology. By lectures, discussions, and papers senior majors recall and reassess their previous psychology courses, fill gaps in their background, and work on the growing edge of the science. The examination in this course satisfies the departmental requirement of a comprehensive examination. Mr. Haslerud. Prereq.: 12 semester credits in Psychology. 3 cr. *Required of all undergraduate majors in Psychology.*

98. Honors in Psychology. Open to seniors with a 3.0 average in psychology courses and the recommendation of a member of the psychology faculty, or in unusual cases to those who receive special departmental permission. As individuals, or as members of a seminar group, students make library and/or laboratory investigations of problems of mutual interest to professor and student. Oral or written reports will be made by members of the seminar as the basis for discussion. Prereq.: 15 semester credits in Psychology. 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

RECREATION EDUCATION

(See Physical Education Teacher Preparation Curriculum for Women)

RESERVE OFFICERS TRAINING CORPS

Department of Military Science

Lieutenant Colonel Joseph P. Stabler, Artillery, *Professor;* Lieutenant Colonel Warren W. Witt, Infantry, *Assistant Professor;* Major John B. Hammond, Infantry, *Assistant Professor;* Captain Robert R. Nourse, Infantry, *Assistant Professor;* Captain Paul D. Tomlingson, Infantry, *Assistant Professor;* Master Sergeant Edison E. Temple, *Assistant;* Sergeant First Class Clinton F. Ramey, *Assistant;* Staff Sergeant Norman D. Tufts, *Assistant;* Master Sergeant Clarence P. Andersen, U. S. Army (Retired), *Army ROTC Property Officer*

The Army Reserve Officer Training Corps offers a course of instruction leading to a commission as a second lieutenant in one of sixteen branches of the United States Army. Successful completion of the course and the award of a baccalaureate degree by the University qualify the graduate for this commission.

The Military Science courses follow the student's normal academic progression, i.e., a student takes Military Science 13-14 during his freshman year and Military Science 23-24 during his sophomore year. If he elects and is accepted for Advanced ROTC, he will take Military Science 33-34 and Military Science 43-44 during his junior and senior years respectively.

The Army basic course satisfies the two-year required military training of the undergraduate by providing instruction in military subjects as noted below.

To qualify for the advanced course and its military allowance of $27.00 per month, applicants are required to have earned a minimum overall cumulative grade average of 2.0, to have demonstrated positive leadership potential in the basic course, to be physically qualified, to be selected by the Professor of Military Science, and to be approved for admission to the program by the President of the University.

M.S. 13. Fundamentals of Military Science. The organization of the Army and ROTC and the Army and national security. Practical training in leadership, marksmanship, military drill, and command provides a balanced picture of the mission of the Army and an introduction to the military program. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 14. Concurrent Development. An integrated course consisting of leadership laboratory conducted by the Army ROTC Department and an elective University subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will develop the cadet's potential. The elective course must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. A course falling within one of these areas, which is also required in the student's college curriculum, is acceptable. Credit is awarded after satisfactory completion of the elective course and leadership laboratory. Cr.

M.S. 23. American Military History. A survey of American military history from the origins of the American Army to the present with emphasis on the factors which led to the organizational, tactical, logistical, operational, strategic, social and similar patterns found in our present-day Army and society. Practical application of leadership, drill, and command. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 24. Land Navigation and the Principles of Military Operations. The science of military maps and land navigation. An introduction to military operations with emphasis on the principles of firepower and maneuver. Practical application of leadership, drill, and command. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 33. Professional Development. Military instruction for two hours each week plus a three-credit academic subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will contribute to the cadet's potential as a prospective Army officer. The academic subject must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. Military instruction, a prerequisite for cadet subsistence pay and commissioning, will include leadership laboratory and branches of the Army. The integrated course of instruction outlined above must provide for a minimum of five hours of instruction per week. Credit is awarded upon satisfactory completion of the elective course and leadership laboratory. Cr.

M.S. 34. Military Leadership and Command. The principles of leadership. The theory and practice of military teaching methods. Small unit tactics. Military communication facilities. Leadership laboratory to include exercise of command of small units. Minimum of five hours of instruction per week. 3 cr.

M.S. 43. Principles of Command and Staff. An introduction to the military staff and military staff work to include the relationship between command and staff, relationship of staff to subordinate units, command channels, liaison, military intelligence, and training management. Military logistics to include troop movements, motor transportation, and supply and evacuation. Army administration and military law. Leadership laboratory to include practical application of leadership principles and exercise of command. Minimum of five hours of instruction per week. 3 cr.

M.S. 44. Professional Development. Military instruction for two hours each week plus a three-credit academic subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will contribute to the cadet's potential as a prospective Army officer. The academic subject must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. Military instruction, a prerequisite for cadet subsistence pay and commissioning, will include leadership laboratory, service orientation, and a study of the role of the United States in world affairs. The integrated course of instruction outlined above must provide for a minimum of five hours of instruction per week. Credit is awarded upon satisfactory completion of the elective course and leadership laboratory. Cr.

M. S. 66. Army ROTC Band. Open only to freshmen and sophomore men enrolled in the Army ROTC program on basis of individual tryouts. This band furnishes music for all Army ROTC military functions. 2 labs.; ½ cr.

Army Flight Training. A program conducted by licensed flight instructors which includes a thirty-five hour ground school and a thirty-six hour flying phase. Successful completion may lead to a private pilot's license and a career in Army aviation. Open to Army ROTC senior advanced-course students who can meet physical and aptitude requirements. No credit.

Department of Air Science

Colonel John F. Britton, USAF, *Professor;* Lieutenant Colonel William J. Luckey, USAF, *Assistant Professor;* Major Donald A. Lundholm, USAF, *Assistant Professor;* Captain Malcolm B. Robertson, USAF, *Assistant Professor;* Captain Robert G. Moore, USAF, *Assistant Professor;* Master Sergeant Jefferson T. Joyner, USAF, *Assistant;* Staff Sergeant John B. MacDonald, USAF, *Assistant;* Staff Sergeant Ralph G. Ordway, USAF, *Assistant;* Airman First Class James H. Allen, USAF, *Assistant;* Airman First Class Alfred Seppy, USAF, *Assistant*

Entrance requirements for basic Air Force ROTC are lenient, while those for advanced are quite strict. Selection for advanced in both the flying and non-flying categories is based on character, attitude, academic record, and leadership ability. Each cadet selected for advanced Air Force ROTC must be a student in good standing with the University and Air Force ROTC, must successfully complete a battery of officer qualification tests, and be physically qualified for an Air Force commission.

About one-third of those admitted into advanced are physically qualified for, and desire, flight training as pilots or observer. Pilot cadets will receive, during their senior year, 36½ hours of flight instruction under the supervision of the Federal Aviation Agency, leading toward a private pilot's license. As there is a special need for Air Force officers with engineering backgrounds, students taking such courses are urged to apply for the advanced phase. In addition to uniforms provided to all cadets enrolled in AFROTC, advanced cadets receive a subsistence allowance during the junior and senior years, including summer periods.

A.S. 13. Air Leadership. Air laboratory of one hour each week. Course is mandatory for all Air Science freshmen. In addition, the student must successfully complete a University course of at least two credits during the semester. Normally English I will complete this requirement. In addition,

the following courses will satisfy the substitute course requirement: English 1, 2, 13 or 14; History 1 or 2; Biology 1, 2, or 3; Chemistry 1, 2, 3, 4 or 5; Geology 1 or 2; Physics 1, 2 or 18; Mathematics 2, 3, 7, 8, 21 or 22; Sociology 33; Botany 1. The student must designate one of the courses listed above as a substitute for the academic portion of A.S. 13. Variations from these courses will be made through the Department of Air Science. No credit.

A.S. 16. Foundations of Aerospace Power. An introductory examination of the factors of aerospace power, major ideological conflicts, requirements for military forces in being, responsibilities of citizenship, development and traditions of the military profession, role and attributes of the professional officer in American democracy, organization of the armed forces as a factor in the preservation of national security, and the United States Air Force as a major factor in the security of the free world. Three hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 25. Fundamentals of Aerospace Weapon Systems. An introductory survey of aerospace missiles and craft, and their propulsion and guidance systems; target intelligence and electronic warfare; nuclear, chemical and biological warhead agents; defensive, strategic and tactical operations; problems, mechanics and military implications of space operations; and a survey of contemporary military thought. Three hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 28. Air Leadership. Air leadership laboratory of one hour each week. Course is mandotary for all Air Science sophomores. In addition, the student must successfully complete a University course of at least two credits during the semester. Normally one of the following will complete this requirement: English 13, 14 or 16; Humanities 1 or 2; Foreign Language; Biology 1, 2 or 3; Chemistry 1, 2, 3 or 4; Geology 1 or 2; Physics 1, 2, 9, 18, 23 or 24; Mathematics 2, 3, 7, 8, 21, 22, 23 or 24. The student must designate a substitute course during registration for that semester to the Department of Air Science. Variations from these courses will be made through the Department of Air Science. No credit.

A.S. 35. Air Force Officer Development. A study of the knowledge and skills required of a junior officer in the Air Force. This includes staff organization and functions and the techniques of communication, instruction and problem solving. Leadership laboratory, as provided by command and staff positions in the cadet wing, prepares the student for the summer training program which normally follows immediately after A.S. 36. Four hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 36. Air Force Officer Development. Principles and practices of leadership. This includes basic psychology of leadership, the military justice system, and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Leadership laboratory, as provided by command and staff positions with the cadet wing, prepares the student for the summer training program which normally follows immediately after A.S. 36. During summer training the student will have the opportunity to become familiar with life at an Air Force base, and obtain orientation flights in Air Force aircraft. Four hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A. S. 45. International Relations. A study of international relations with emphasis on those factors of special interest to the Air Force officer. Considers the various determinants of a nation's power, the bases for power alignments in the world, efforts to alleviate major sources of tension among

nations and current attempts to maintain world peace through international organizations. Flight instruction, training in weather and air navigation, and an opportunity to qualify for a private pilot's license is offered to selected cadets. Four hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 46. Military Aspects of World Political Geography; and the Air Force Officer. Course is devoted to study of the concepts of the military aspects of political geography, maps and charts, factors of power and the geographic influences upon political problems with a geographical analysis of the strategic areas. A study is also made of materials to help the cadet make a rapid, effective adjustment to active duty as an officer in the Air Force. Four hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

RUSSIAN

(See Foreign Languages and Literatures)

SECRETARIAL

Doris E. Tyrrell, *Associate Professor;* Myra L. Davis, *Assistant Professor*

1-2. Shorthand. Principles of Gregg shorthand with practice in transcribing from shorthand plates and class notes. Secl. 7-8 must be taken in conjunction with this course or precede it. Miss Tyrrell. Prereq.: Permission of instructor. 3 cr.

3-4. Advanced Shorthand. A review of fundamental principles, the building of shorthand vocabulary, practice in taking dictation at increasing rates of speed, and practice in developing skill and speed in transcription. Miss Tyrrell. Prereq.: Secl. 2 or equivalent and permission of instructor. 3 cr.

5, (5). Personal Use Typewriting. Practice in acquiring correct typing techniques, arranging letters, outlines, notes, themes, bibliographies, and simple tabulations. Open to any student who does not know how to typewrite. Miss Davis. Prereq.: Permission of instructor. 5 lab.; 1 cr.

7-8. Typewriting. Practice in acquiring correct typewriting techniques and in arranging letters, tabulations, and simple manuscripts. Miss Davis. Prereq.: Permission of instructor. 5 lab.; 2 cr. *(See Secl. 27.)*

9-10. Advanced Typewriting. Practice in tabulating and in writing business letters, legal papers, and various business forms. Miss Davis. Prereq.: Secl. 8 or the equivalent and permission of the instructor. 5 lab.; 2 cr.

11. Filing. Various alphabetic, numeric, geographic, and subject-matter systems of correspondence filing; cross reference; follow-up methods; filing supplies and equipment. Miss Davis. Prereq.: Secl. 7 and permission of instructor. 2 cr.

(13). Office Machines. Duplicating methods: practice in typing master copies and stencils, and in operating an electric typewriter, a mimeograph, a mimeoscope, and a liquid process duplicator; practice in machine transcription; and an introduction to adding and calculating machines. Miss Davis. Prereq.: Secl. 8 and permission of instructor. 5 lab.; 2 cr.

17. Secretarial Office Procedure. Discussion of secretarial duties and traits; problems in the discharge of various duties; problems in office management. Miss Tyrrell. Prereq.: Secl. 3 and 9, or these courses taken in conjunction with Secl. 17, and permission of instructor. 3 cr.

18. Secretarial Office Practice. Practice secretarial work in business offices. Miss Tyrrell. Prereq.: Secl. 4 and 10, or these courses taken in conjunction with Secl. 18, and permission of instructor. 10 hours a week; 3 cr. *(Note: This course is open only to students who entered before the fall of 1963.)*

22. Advanced Dictation. Speed building in dictation and transcription. Miss Tyrrell. Prereq.: Secl. 4 and permission of instructor. 3 cr.

23-24. Business Writing. Review of grammar, word usage, punctuation, and sentence construction. Practice in writing various types of business letters and reports; proofreading; editing. Prereq.: One semester of typewriting preceding this course or taken in conjunction with it. Miss Tyrrell. 3 cr.

27. Typewriting. Practice in acquiring typewriting techniques, and in arranging letters, tabulations, and simple manuscripts. This course, which begins on October 28, 1963, is to be taken instead of Secl. 7 by Secretarial students who have had Secl. 5 or the equivalent. Prereq.: Secl. 5 or equivalent and permission of instructor. Miss Davis. 5 lab.; 1 cr.

SOCIAL SCIENCE

This course is given under the auspices of the Division of Social Science of the Faculty of the College of Liberal Arts. The Division includes the departments of Government, History, Hotel Administration, Psychology, and Sociology, and the Whittemore School of Business and Economics.

81, (81). Internships. Field work in a department, agency, or institutional setting of the state or local government, or in a selected and approved private agency. The work will be under the supervision of the department or agency to which the student is appointed. The chairman of the department involved or his representative will be responsible for arranging the student's individual internship program. Prereq.: Internships for seniors only may be approved by the departments of Government, History, Psychology, or Sociology or the Whittemore School of Business and Economics. Not more than 16 credits. *No more than 9 credits may be counted toward the completion of major requirements.*

SOCIOLOGY

Richard Dewey, *Professor;* Charles W. Coulter, *Professor Emeritus;* Melville Nielson, *Associate Professor;* Stuart H. Palmer, *Associate Professor;* Melvin T. Bobick, *Assistant Professor;* Maurice Richter, Jr., *Assistant Professor;* Richard E. Downs, *Assistant Professor;* Pauline Soukaris, *Instructor;* Owen B. Durgin, *Registrar*

1, (1). Introductory Sociology. Man's social and cultural relationships as revealed in his customs and institutions. Social theory, methods and techniques of research, and current research findings. 3 cr.

(18), 18. Social Problems. How culture in the form of customs and institutions is related to such human problems as crime and delinquency, alcoholism, physical and mental disease, sex pathologies, poverty, old age, broken families, and racial and religious prejudices. *Especially for students who do not intend to major in Sociology.* Prereq.: Soc. 1. 3 cr.

27, (27). The Family. The family as a social institution with special attention given to the contemporary United States family. *Not open to freshmen.* 3 cr. (Formerly Soc. 72.)

33, (33). Cultural Anthropology. The concepts and methods of anthropology. The structure of culture; culture and personality; economic, family, educational, political, and religious institutions; art; language. Data concerning various primitive societies are presented. 3 cr.

42. Introduction to World Ethnography. Primarily for sociology majors and minors but also for those with a general interest in sociology or anthropology. Selected studies of peoples in the major ethnographic areas of the world. Particular attention will be paid to historical and geographic factors involved in these areas, types of social and economic organization, and problems involved in the comparative study of human societies and institutions. Prereq.: Soc. 33 or the consent of the instructor. 3 cr.

(44), 44. Social Psychology. Individual actions, attitudes, ideas, and perceptions as influenced by socio-cultural environments. Individual-cultural relations in education, religion, economics, aesthetics, ethics, and deviant behavior. Prereq.: Soc. 1. 3 cr.

45. Rural-urban Sociology. Application of sociology principles to the study of customs and institutions in rural and urban settings. Differentiation between influences upon community organization of culture on the one hand and population size and density on the other. Prereq.: Soc. 1. 3 cr.

48. Population Problems. Basic concepts of population analysis; theories of population change; the world population growth in the past and present; population problems and policies in hungry and affluent nations. 3 cr.

49. Communication in Society. Social aspects of the communication process. Cultural prerequisites of communication; premises, purposes, and procedures of communication content analysis; communication in crowd, mass, and public; the organization of mass communication systems in traditional totalitarian and democratic societies; and audience reactions to communicated messages. Prereq.: Permission of the instructor. 3 cr.

54. Culture Change. A study of various types of society, leading to the development of a theory of culture change. Assignments include descriptive studies of institutional as well as theoretic materials selected from the writings of Comte, Marx, Spencer, Durkheim, Spengler, Sorokin, Redfield, and others. Prereq.: Soc. 1 or consent of instructor. 3 cr.

57. Social Stratification. Nature, functions, patterns, and effects of social stratification. Social mobility. Special attention is given to the social class system in the United States. Prereq.: Soc. 1. 3 cr.

(58), 58. Race and Ethnic Relations. Majority-minority group relations. Special attention is given to the nature and results of Negro-White and ethnic group relations in the United States. 3 cr.

62. Social Movements. The factors related to the origin and development of reform, revolutionary, religious, and other social movements. The organization, structure, tactics, and leadership of social movements. The purposes and consequences of selected movements, as well as to the relationships between social movements and social change. Prereq.: Soc. 1. 3 cr. (Not offered in 1963-64.)

71, (71). Criminology. An analysis of the scientific study and of the control of crime. The following are considered in some detail: indexes, rates and theories of crime and delinquency, police, courts, probation, prison and parole. The student attends one hour lecture and one hour discussion each week. 3 cr.

73, 74. Introduction to Social Welfare. The field of social welfare: history, public welfare, case work, social group work, community organization for social welfare. For Sociology majors and students enrolled in the Social Service curriculum; others may be admitted by permission of the instructor. 3 cr.

75-76. Methods of Social Research. Analysis of research problems. Designing field studies and experiments. Demonstration and practice in sampling, schedule construction, and interviewing techniques. First semester: use of elementary statistical techniques in analysis of prepared data. Second semester: methods of observation. For Sociology majors and students enrolled in the Social Service curriculum; others may be admitted by permission of instructor. 3 cr.

85, 86. Development of Sociological Theory. Social thought from Plato to the present. First semester: the works of selected individuals from Plato to Comte. Second semester: the 19th century European social philosophers; the ideas of U. S. social scientists, especially upon their contributions to present day sociological thought. Students not majoring in Sociology may be admitted by permission of the instructor. 3 cr.

88. Crime Control. A seminar course on the theory and practice of preventing crime and delinquency and of rehabilitating the criminal and the delinquent. There will be a number of lectures by, and discussions with, various penologists. Prereq.: Soc. 71. Permission of instructor. 3 cr. (Limited to 15 students.)

92. Fields of Sociology. Various subject areas of sociology: their growth and development, their relationship to one another, and their current status with regard to research and theory. Recent developments and the newer subject areas of sociology. Future developments as extensions of present trends. Students not majoring in Sociology may be admitted by permission of the instructor. 3 cr.

97. Social Welfare Field Experience. To give the student an understanding of social welfare through observation and participation. Students will work in a social welfare setting for a period of eight weeks (or its equivalent). This field work is generally done during the summer following the junior year. Weekly seminar sessions constitute the classroom work of the course. Prereq.: Soc. 73, 74 and permission of the instructor. 6 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

SPANISH

See Foreign Languages and Literatures

SPEECH AND DRAMA

Joseph D. Batcheller, *Associate Professor;* Edmund A. Cortez, *Professor;* John C. Edwards, *Associate Professor;* Phyllis D. Williamson, *Instructor;* Gilbert B. Davenport, *Instructor;* Robert L. Minter, *Instructor*

B. Speech Improvement. All entering freshmen and transfer students are required to take a speech test. They are classified as Group I, having no apparent problem; Group II, needing speech improvement; or Group III, having a relatively serious speech problem. Those students classified in Group III are required to meet individually or in groups with the staff and students in clinical practice for non-credit Speech Improvement until such time as they have made sufficient improvement. A student may be remanded to Speech Improvement by any instructor with the approval of the Speech staff. This course replaces English B. Mrs. Williamson. No cr.

5, (5). Basic Speech. A beginning course in the social, psychological, physiological, and phonetic bases of speech. Projects in informal public speaking, oral interpretation, discussion, and elementary phonetic transcription are used: (1) to illustrate the bases and (2) for the improvement of the individual student. This course is strongly recommended for those students who are classified in Group II on the speech test. Required of all majors, but without major credit. Mrs. Williamson. 3 cr.

15, (15). Public Speaking. The basic speaker, materials, presentation, occasion, and audience relationships. An introduction to extemporaneous and impromptu speaking for the purposes of informing and convincing. Practice in speaking with evaluation and constructive comment by the instructor and audience. Cannot be counted for major credit. This course replaces English 35 and should not be taken by anyone who has credit for English 35. Mr. Cortez and staff. 3 cr.

21. Introduction to Theater Arts. The basic elements common to the varied media of theater; legitimate, musical, cinema, and television. The place of the theater in our lives. An introduction to theater practices from the script to production. Mr. Batcheller. 2 lec.; 1 lab.; 3 cr.

24. Theater and Its Drama. The relation of theater and its drama to the society in which it is produced. A comparative study of outstanding modern plays and historical counterparts. Mr. Batcheller. 1 lab.; 3 cr.

25. Discussion. The means and ends, values, and limitations of the various types of discussion. Group dynamics, logic and evidence, and parliamentary procedure as applied to learning and problem solving. Practice in using various methods to gain the objectives of discussion. This course replaces English 33 and should not be taken by anyone who has credit for English 33. Mrs. Williamson. 3 cr.

28. Debate. The various forms of advocacy as an extension of discussion. The analysis of propositions, the construction of a case, logic and ethical persuasion, and the presentation of speeches of advocacy. The course replaces English 34 and should not be taken by anyone who has credit for English 34. Mrs. Williamson. 3 cr.

29, (29). Discussion and Debate Practice. Responsible preparation for and participation in intra- and inter-collegiate discussion or debate. May be repeated to a total of 4 credits toward graduation. Cannot be counted for major credit. Prereq.: Debate and approval of the instructor. Mrs. Williamson. 1 cr.

37, (37). Stagecraft. An introduction to stage and television scenery, costumes, properties, lighting, sound, and backstage organization. Practical application in University Theater productions. This course replaces Arts 35 and should not be taken by anyone who has credit for Arts 35. Mr. Davenport. 1 lec.; 2 lab.; 3 cr.

40. Scenic Design and Lighting. A study of the problems of stage design and lighting for theater and television. Individual projects, models, and participation in University Theater and television productions. Prereq.: Stagecraft or approval of the instructor. Mr. Davenport. 1 lec.; 2 lab.; 3 cr.

43. Acting. The relation of the actor to other theater workers in producing a play. Analysis of the role, creation of images, rehearsal and performance problems of legitimate theater and television. This course replaces English 47 and should not be taken by anyone who has credit for English 47. Prereq.: 6 credits in Speech and Drama or approval of the instructor. Mr. Edwards. 1 lec.; 2 lab.; 3 cr.

45, (45). Theater Practice. Application of the theory of acting, directing, or the technical aspects of production to specific assigned responsibilities in University Theater productions. May be repeated to 4 credits toward graduation, but cannot be counted for major credit. Prereq.: the basic courses in which the practice credit is taken and approval of the instructor. Mr. Batcheller. 1 cr.

49. Television and Radio Workshop. The application of basic theater techniques to electronic means of mass communication. The place of television and radio in our society. Production techniques. Actual practice in campus studios. Mr. Cortez. 1 lec.; 2 lab.; 3 cr.

52. Rhetoric in the Western World. A study of great speeches in the history of western civilization; an analysis of the reasons for their success or failure on a basis of the speaker, his materials, the logical and persuasive appeals, the audience background and attitudes, and the occasion. Of special interest to history, government, sociology, and psychology majors as well as students interested in relationships of language and social problems. Prereq.: 6 credits in Speech and Drama or approval of the instructor. Mrs. Williamson. 3 cr. (Alternate years; offered in 1963-64.)

53. Speech Correction. Further study of the psychological, physiological, and phonetic bases of speech with the addition of the neurological, genetic, and physical bases towards the end of recognizing abnormalities of speech, some of their causes, and their basic therapy. Delayed speech, articulatory and voice disorders, foreign dialects, stuttering, aphasia, cerebral palsy, and audiology are the principal problems studied. Prereq.: Basic Speech or approval of the instructor. Mrs. Williamson. 3 cr.

56. Clinical Methods. A continuation of Speech Correction dealing with the theory of remedial practices for various speech problems and providing experience in speech therapy by demonstration and laboratory in conjunction with Speech Improvement. Prereq.: Speech Correction. Mrs. Williamson. 1 lec.; 2 lab.; 3 cr. (Alternate years; not offered in 1963-64.)

62. Directing. The analysis of the script, the determination of specific treatment of the production, the development of a prompt script, casting, rehearsal, and production for legitimate theater and television. This course replaces English 48 and should not be taken by anyone who has credit for English 48. Prereq.: 6 credits in Speech and Drama or approval of the instructor. Mr. Edwards. 1 lec.; 2 lab.; 3 cr.

64. Speech for Prospective Teachers. Developing an adequate conversational form of speaking before the class; speech improvement for the prospective teachers; voice recording and analysis; oral interpretation of both prose and poetry; making and using visual aids; and the means of developing a communicative speaker-audience relationship. This course replaces English 36 and should not be taken by anyone who has credit for English 36. Mr. Cortez. 3 cr.

ZOOLOGY

George M. Moore, *Professor;* C. Floyd Jackson, *Professor Emeritus;* Lorus J. Milne, *Professor;* Edythe T. Richardson, *Professor;* Emery F. Swan, *Associate Professor;* Wilbur L. Bullock, *Associate Professor;* Paul E. Schaefer, *Associate Professor;* Paul A. Wright, *Associate Professor;* Philip J. Sawyer, *Associate Professor;* Marcel E. Lavoie, *Associate Professor;* Arthur C. Borror, *Assistant Professor;* Alan G. Lewis, *Assistant Professor;* Robert Detwyler, *Instructor;* Burton C. Staugaard, *Instructor*

4. General Zoology. Survey of the animal kingdom, accompanied by dissection of selected types. This course is designated to be taken concurrently with Biology 2, but may be taken by students who have credit for Biology 2 or 3. Prereq.: Biol. 1 or Bot. 1; and Biol. 2 taken concurrently. 1 lec.; 1 lab.; 2 cr.

17-18. Mammalian Anatomy and Systematic Physiology. The anatomy and physiology of mammals with a strong emphasis on man's morphological heritage and relationships. Prereq.: Biol. 2 or 3 or Zool. 48. 3 lec.; 1 lab.; 4 cr.

19. Kinesiology. Bodily movements. The relation of skeleton, muscles, and joints in movements. Designed primarily for Occupational Therapy students and for students in the Physical Education Teacher Preparation curriculum. Mrs. Richardson. Prereq.: Zool. 18. 2 lec.; 1 lab.; 3 cr.

36. Ornithology. Birds, their identification, migration, life-history, and economic importance with special reference to those of eastern North America. Mr. Sawyer and Mr. Borror. Prereq.: Biol. 2 or 3 or equivalent. 1 lec.; 2 lab. or field trips; 3 cr.

48. Principles of Zoology. The principles of animal biology, including ecological relationships, embryology, physiology, and genetics, with emphasis on man and other vertebrates. Prereq.: Biol. 1 or Bot. 1. *Required of freshmen in Agriculture.* 2 lec.; 1 lab.; 3 cr. *This course cannot be used to satisfy major requirement.* (Not open to those who have credit for Biol. 1-2, or 3.)

51. Parasitology. An introductory course on some of the more important parasites causing diseases of man and animals. Mr. Bullock. Prereq.: Biol. 2, or 3, and a year of Zoology. 2 lec.; 2 lab.; 4 cr.

52. Wildlife Parasitology. Some of the common helminth and protozoan parasites of local marine, freshwater, and terrestrial vertebrates. Techniques for examination, collection, staining, and identification are included. Mr. Bullock. Prereq.: General Zoology. 2 rec.; 2 lab.; 4 cr. *(Offered in Summer only.)*

55, 56. Invertebrate Zoology. The morphology, phylogeny, and natural history of the major invertebrate groups. Staff. Prereq.: General Zoology, and 8 credits of Zoology. 2 rec.; 2 lab.; 4 cr.

57. Comparative Physiology. A survey of means whereby animals, both vertebrate and invertebrate, have met the problems of irritability, nutrition, maintenance of a constant internal environment, and reproduction. Mr. Lavioe. Prereq.: Biol. 2, or 3, one year of Zoology, college Physics, and Organic Chemistry. 3 lec.; 1 lab.; 4 cr.

59. General Physiology. The fundamental physiological properties of excitability, contractility, conductivity, metabolism, growth, and reproduction. Mr. Wright. Prereq.: Biol. 2, or 3, one year of Zoology, college Physics, and Organic Chemistry. 3 lec.; 1 lab.; 4 cr.

61. Genetics. The physical basis of inheritance, expression, and interaction of the hereditary units, linkage, and variation. The application of Mendelian principles to plant and animal breeding. Mrs. Richardson. Prereq.: Biol. 2, or 3, or Bot. 1 and Zool. 43. 3 lec.; 3 cr.

62. Advanced Genetics. The recent advances in genetics and cytogenetics. Mrs. Richardson. Prereq.: Zoology 61. 2 lec.; 2 lab.; 4 cr.

64. Neurology. Practical study of morphology, physiology, and histology of the human nervous system. Mrs. Richardson. Prereq.: Biol. 2, or 3, and one year of Zoology. 3 lec.; 1 lab.; 4 cr.

65. Embryology. The fundamental principles of development. The developmental process from the egg to the formation of the body and the establishment of the principal organs and systems. Mr. Staugaard. Prereq.: Zool. 4 or 7. 2 lec.; 2 lab.; 4 cr.

66. Elements of Histology and Microtechnique. The microscopic anatomy of principal tissues and organs of vertebrates with an introduction to general histological techniques. Mr. Staugaard. Prereq.: Zool. 8 or 17. 2 lec.; 2 lab.; 4 cr.

68. Natural History of Marine Inverterbates. A field and laboratory course aiming at acquainting the student with the inshore marine invertebrate metazoan animals of northern New England. Emphasis will be on identification, classification, habitat preferences and behavior of these animals. Field work (collections and observation) will constitute a major part of the course. Mr. Swan. Prereq.: General Zoology. 1 lec.; 3 lab.; 4 cr. (*Offered in Summer only.*)

71. Principles of Ecology. The interrelationships of plants and animals with both their living and non-living environments. Attention will be given to energy relationships, limiting factors, community organization, succession and biogeography. Mr. Swan. 3 cr.

72. Advanced Ecology. (a) Terrestrial, (b) Freshwater, (c) Marine. An intensive study of the ecology of one of the major habitat areas with the application of general ecological principles and of methods especially applicable to the habitat studied. Staff. Prereq.: A course in Principles of

Ecology and permission of the instructor. 2 lec.; 2 labs.; 4 cr. Different subdivisions of this course may be taken to a total of not more than 12 credits.

76. Invertebrate Embryology. The developmental patterns as exhibited by the major invertebrate groups. This will be essentially a descriptive study based upon lectures, library work, and laboratory work with living material. Prereq.: General Zoology. 2 lec.; 2 lab.; 4 cr. *(Offered in Summer only.)*

77, 78. Natural History and Taxonomy of the Vertebrates. A study of the various classes of vertebrates; their habits, habitats, and life histories with special reference to those occurring in eastern North America. Zoology 77 will include the fishes, amphibia, and reptiles. Zoology 78 will cover the mammals and birds. Mr. Sawyer. Prereq.: General Zoology. 2 lec.; 2 labs.; 4 cr.

97, 98. Special Problems. Advanced students may elect a special problem provided they present a detailed outline of the subject and can furnish adequate proof of their ability to carry it out with equipment available. Mr. Moore and staff. Prereq.: Permission of the Chairman of the Department. 1-4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

Summary of Registration

	Agriculture				Liberal Arts				Technology				Miscellaneous				Total											
																	Men				Women				Both			
	1961-62	1960-61	1959-60	1958-59	1961-62	1960-61	1959-60	1958-59	1961-62	1960-61	1959-60	1958-59	1961-62	1960-61	1939-60	1958-59	1961-62	1960-61	1959-60	1958-59	1961-62	1960-61	1959-60	1958-59	1961-62	1960-61	1959-60	1958-59
Senior	54	49	62	65	522	521	517	493	117	136	129	153	.....	.....	.....	.....	404	503	498	490	289	203	210	221	693	706	708	711
Junior	56	63	42	61	586	606	536	530	124	129	153	177	.....	.....	.....	.....	448	467	468	547	318	331	263	221	766	798	731	768
Sophomore	73	78	69	45	775	674	657	567	161	151	158	180	.....	.....	.....	.....	470	547	574	530	440	356	310	262	910	903	884	762
Freshmen	81	77	76	84	856	806	696	714	215	246	256	263	.....	.....	.....	.....	641	655	637	650	511	474	391	411	1152	1129	1028	1061
Specials	4	7	6	7	70	63	76	85	5	6	13	20	.....	.....	.....	.....	42	32	60	89	37	44	35	43	79	76	95	132
Graduate	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	519	340	252	249	392	261	197	211	125	76	55	38	517	340	252	249
Total—Regular curricula	268	274	255	262	†2809	2670	2482	2389	622	668	709	793	519	340	252	249	2397	2468	2434	2517	1720	1484	1264	1196	4117	3952	3698	3713
Non-degree curricula																												
2nd year, TSA	32	24	29	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	22	27	20	1	2	2	2	30	24	29	22
1st year, TSA	75	38	40	55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	74	34	40	55	3	4	.....	.....	77	38	40	55
Total	107	62	69	77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	103	56	67	75	4	6	2	2	107	62	69	77
Summer School	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1177	1129	1028	934	693	628	583	544	484	501	445	390	1177	1129	1028	934
Extension courses	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1971	*1735	.....	.....	1275	1072	.....	.....	696	663	.....	.....	1971	1737
Credit	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2531	2022	.....	.....	1669	1215	.....	.....	1103	807	.....	.....	2772	2022	.....	.....
Non-credit	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	204	359	.....	.....	159	276	.....	.....	45	83	.....	.....	204	359	.....	.....
General Electric	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	103	75	55	52	103	75	55	52	.....	.....	.....	.....	103	75	55	52
Total—short curricula	107	62	69	77	.....	.....	.....	.....	.....	.....	.....	.....	4015	3585	3054	2721	2737	2250	1980	1743	1636	1397	1143	1055	4363	3647	3123	2800
Grand Total	375	336	324	339	*2809	2670	2482	2389	622	668	709	793	4534	3925	3306	2970	5124	4718	4414	4260	3356	2881	2407	2251	8180	7599	6821	6511
Less duplicates	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1296	927	490	279	831	676	348	233	465	235	131	46	1296	911	479	279
NET GROSS TOTALS	375	336	324	339	*2809	2670	2482	2389	622	668	709	793	3238	2998	2816	2691	4293	4042	4066	4027	2891	2646	2276	2205	7184	6688	6342	6232

* Semester I & II, 1958-59 and thereafter

† Includes Whittemore School

Index

Academic requirements 42
Academic year 4-5
Accounting 122, 126, 150-152
Administrative officers 7-9
Admission 40-44
Agricultural Business and Marketing 46, 49
Agricultural Economics 50 137-138
Agricultural Education 51, 137
Agricultural Engineering 55-56 139-140
Agricultural Placement 63
Agricultural Science 46, 49
Agricultural Technology 46, 49
Agriculture College 45-65
Agriculture Teacher Preparation 87
Agronomy 51, 140-141
Air Science 224-226
Animal Science 51-52, 141-142
Art Education 67, 87, 147
Arts, The 67-68, 143-147
Assistantships 135
Athletics 212-213

Bachelor of Arts 67
Bachelor of Science 45, 82-85, 107
Band 201
Biochemistry 52, 142-148
Biological Sciences Division 66-67
Biology 68-69, 148
Botany 52, 69, 149-150
Business Administration 122, 127, 150-152

Calendar 4-5
Certificates
in Thompson School of Agriculture 64
in Occupational Therapy 83-85
Certification for Teachers 87
Chemical Engineering 108, 111, 152-153
Chemistry 108, 112, 154-155
Choir, Concert 201-202
Civil Engineering 108, 113-114, 156-158
Clothing and Textiles 61-62, 188
College Board Scholastic Aptitude Test 40
Commercial Teacher Preparation 87
Courses 136-234
Crafts 68

Dairy Science 52-53, 158-159
Degree Requirements
College of Agriculture 47
College of Liberal Arts 91-95
College of Technology 107
Whittemore School of Business and Economics 120
Dental, Pre- 82
Doctor's degree 135
Drama 80-81, 230-232
Dual degree program 91, 110, 121

Economics 122-123, 128-129, 159-161

Education 70, 161-165
Electrical Engineering 108, 115-116, 165-167
English 70-71, 167-169
Ensemble 201
Entomology 53, 71, 169-170
Expenses 42-43

Faculty and staff 10-39
Fees 42
Financial aid 43-44
Fine Arts 67-68, 143-147
Food and Nutrition 62, 188-189
Ford Foundation scholarship program 91, 121
Foreign Languages and Literatures 71-72, 170-177
Forest Game Management 59, 177
Forestry 57-59, 177-179
French 171-172

General Liberal Arts curriculum 67-81, 91-96
General Physical Science 72, 182
Geology and Geography 72-73, 179-182
German 172-173
Glee clubs 201
Government 73-74, 182-185
Graduate School 135
Greek 174

History 74-75, 185-187
History of Art 68
History and Literature 75
Home Economics 59-62, 88, 187-190
Home Economics Education 61, 88, 189
Honors program 90-91, 109
Horticulture 53-54, 190-191
Hotel Administration 123, 130-131, 192
Housing 43
Humanities Division 66

Independent study plan 90, 121, 193
Institutional Administration 189
Internships
in Occupational Therapy 83-85
in Social Science 227
Italian 174

Joint degree program 91, 110, 121

Languages 71-72, 170-177
Latin 174
Law, Pre- 82
Liberal Arts College 66-106

Master's degree 135
Mathematics 108-109, 117, 194-196
Mechanical Engineering 109, 118, 197-200
Mechanized Agriculture 54
Medical Technology 82-83, 96-97
Medical, Pre- 85, 96-97
Microbiology 76, 200-201
Military Science and Tactics 222-224
Minor program 121
Music 76-77, 201-208

Music Education 88-89, 102-103, 206-208

New England Board of Higher Education 41
Nursing 83, 97
Nutrition 62, 188-189

Occupational Therapy 83-85, 98, 208-209
Orchestra, Symphony 201

Painting and Graphics 67
Philosophy 77-78, 210-211
Physical Education
for Men 88-89, 104, 212-213
for Women 89-90, 105-106, 213-216
Physical Sciences Division 66
Physics 78-79, 109, 119, 217-218
Poultry Science 54-55, 218-219
Prescribed curricula 82-90
Psychology 79, 220-222

Recreation Education 89-90, 106
Regional cooperation program 41
Registration summary 235
Reserve Officers' Training Corps 222-226
Rooms 43
Russian 175

Scholarships 135
Ford Foundation 91, 121
Secretarial curriculum 123-124, 132-134, 226-227
Social Science 227
Social Sciences Division 66
Social Service 79-80, 100, 227-229
Sociology 79-80, 227-229
Spanish 175-177
Speech and Drama 80-81, 230-232
Student Workshop 143
String Orchestra 202
Symphony Orchestra 201

Teacher Education 86-90, 161-165
Division 67
Technology College 107-119
Thompson School of Agriculture 62-65
Trustees 6
Tuition 42

Veterinary, Pre- 55

Whittemore School of Business and Economics 120-134

Zoology 81, 232-234

DATE DUE

DEMCO, INC. 38-2931